Aerial - Boston Central Business District and Study Area

BOSTON REDEVELOPMENT AUTHORITY

CADS PROJECT — Moving Walk Feasibility Study
Preliminary Design Proposal

CADS – Central Area Distribution System

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Preliminary Design Proposal

November, 1970 (Draft)

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TAC Job No. 69042
The Architects Collaborative Inc.
46 Brattle Street, Cambridge, Massachusetts 02138

#16

ACKNOWLEDGEMENTS

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The Design Study is based in part upon the findings and suggestions of other members of the consulting team along with urban planning information from the BRA staff. This consultant would like to acknowledge the continued collaboration which took place between participants.

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Engineering Consultants: Jackson & Moreland
Legal Consultants: Ely, Bartlett, Brown and Proctor

Section 8 CORRIDOR ORIENTATION SYSTEM (GRAPHICS)

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SECTION I

SUMMARY OF PROPOSAL

GENERAL: Boston's evolving form will be a product of its physical constraints, sub-area concept and its transportation network. The City's guidance of the growth and development of the central business district will greatly influence the clarity of this form.

The creation of a pedestrian system gives great development impetus to adjacent and related properties. It has therefore been of prime importance that the alignment and development of the proposed movement system not be based upon visual aspect, user, microclimatic data, or mechanical constraints alone. Urban economics and growth patterns are of great importance as the proposal deals with the transportation fabric of the City and thus with one of the very basic tools of urban planning. The study has adopted as a major objective that the proposed pedestrian Corridor optimize rather than limit the options available to the City for immediate and long range growth and development within the CBD, providing maximum opportunities to regenerate rather than inhibit its future development.

PROPOSAL:SUMMARY

This report outlines a system or framework and set of constraints within which a moving walk system is feasible in the Summer Street-South Station study area of Boston's central business district.

It by no means constitutes a final design but delineates a set of relationships and goals which are felt essential to the success of the proposed pedestrian system.

Those areas identified as requiring special design control and consideration have been outlined, and those which properly fall within the responsibility of developers along

SECTION 2 GENERAL INTRODUCTION

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This study has been conducted by the Boston Redevelopment Authority to determine the feasibility of a 4,000 foot moving walk in the South Station-Summer Street area of the Central Business District (CBD) of downtown Boston, and has been sponsored jointly by a U.S. Department of Transportation Study Grant from the Federal Urban Mass Transportation Administration, and the Transportation Section of the Boston Redevelopment Authority.

It is a continuation of the earlier CADS study (Central Area Distribution System) for evolving a system for distributing persons in Central Boston by providing a supplementary means of transport delivering persons to and from public and private transportation terminals within the Central area.

The moving sidewalk proposal is directed toward relieving pedestrian and vehicular congestion in the CBD, making pedestrian trips more pleasant, increasing the accessibility of more areas in the CBD, and integrating new systems within present transit and automobile networks. Its role will be to bring people from the planned 5,000 car parking garage, and bus and rail terminals in the new Transportation Center complex near the Southeast Expressway to the downtown area, as well as to directly connect with transit stations at either end of the study area.

THE STUDY HAS BEEN CONDUCTED BY THE FOLLOWING TEAM OF CONSULTANTS TO THE BRA DEALING WITH PEDESTRIAN TRAFFIC VOLUMES, SYSTEMS ENGINEERING AND DESIGN, WORKING IN SEPARATE BUT COMMUNICATING ROLES UNDER THE TRANSPORTATION SECTION OF THE BRA:

Traffic Consultant: Murray D. Segal
Engineering Consultant: Jackson & Moreland
Design Consultant: The Architects Collaborative
Legal Consultant: Ely, Bartlett, Brown & Proctor

The Design Consultant team has in addition retained Frank E. Basil, Consulting Engineers and Souza and True, Structural Engineers, in developing environmental or structural proposals.

The Transportation Study has determined present and projected pedestrian volumes along Summer Street, and projected volumes at the Transportation Center and garages. Based upon engineering data, the study has also outlined capacity requirements for the moving walk. This work has been accomplished through a review of reports, conducting of field surveys, determination of future generators and their impact, and projection of future desire lines.

The Engineering Study has investigated the availability of developed moving sidewalk systems and the feasibility of alternate systems not yet developed. Problems associated with various systems were analyzed.

Four moving walk alternatives were examined for their suitability to the Summer Street - South Station area. This work was accomplished through review of available reports, discussions with manufacturers, field observations, interviews, human factors analysis, and exploration of engineering concepts for a new generation of moving walks.

The Design Study conducted by the Architects Collaborative, Inc. (TAC), and presented in the body of this report is intended to outline the architectural and urban design implications of the moving walk and its elevated pedestrian level. Primary objectives have been to determine the relationships which affect the experience of the moving walk user, and to determine the most appropriate design for the elevated structure and access points to the moving walk.

The design study is based in part upon the findings and suggestions of the other members of the consulting team, along with urban planning information from the BRA staff.

Close contact has been maintained with the Architects of the major projects to be constructed in the corridor area. Although none were advanced sufficiently in their design development to contribute strong direction to the moving walk study, the corridor alignment alternates examined consider the architectural problems inherent in relating to abutting parcels and preliminary building designs.

OBJECTIVES AND SCOPE OF THE MOVING WALK FEASIBILITY STUDY AS DELINEATED FOR THE CONSULTANTS BY THE BRA:

Design Study Objectives:

[1] Define the architectural and urban design implications of the new mode of transportation;
[2] Determine the relationships which affect the experience of the moving sidewalk user;
[3] Determine the most appropriate design for the elevated structure and access points for the movement system;
[4] Determine the most appropriate information and orientation graphics for the area of the moving sidewalk study.

Transportation Study:

[1] Determine present and projected pedestrian volumes along Summer Street;
[2] Determine capacity and access point requirements for the moving walk.

Engineering Study Objectives:

[1] Determine state-of-the-art and the problems associated with various types of accelerated speed moving sidewalks;
[2] Determine feasibility and analyze the problems associated with various types of accelerated speed moving walks;
[3] Recommend the moving sidewalk alternatives best suited to the South Station-Summer Street area.

THE CONSULTANTS FOR THE DESIGN STUDY WERE ASSIGNED THE FOLLOWING SCOPE OF WORK:

Background analysis and preparation:
[1] Review available reports and other relevant documents to obtain details on elevated structures for moving sidewalks and escalators;
[2] Review available data concerning project area and proposed uses for parcels alongside the moving sidewalk route;
[3] Prepare initial typical plans for the structure and access points for the moving walk.

General Proposals:
[1] Review engineering outline specifications for alternative moving walks;
[2] Review projections of demand and estimated usage for the moving walk;
[3] Review parameters proposed by the Engineering Consultant for the structural supports and access points for the moving sidewalk.

Preliminary Design Proposal: Prepare preliminary typical plans for the elevated structure and access points for the recommended moving sidewalks with cost estimates.

Final Preliminary Design Proposal: Prepare final, preliminary plans and drawings for the elevated structure and access points to be included within the final report of the BRA.

IN ADDITION, THE DESIGN CONSULTANT CONDUCTED THE GRAPHICS STUDY IN 2 PHASES ENTAILING THE FOLLOWING SCOPE OF WORK:

Preliminary: Outline of requirements and preliminary proposals, including preparation of preliminary plans, drawings and supporting written material for the information and orientation graphics for the area of the moving sidewalk, including a logo or symbol; design of alphabet and numbers in terms of size, proportion, colour and materials; alert or warning devices; sign positionings; sign messages; sign brightness and lighting; and estimated costs.

Final Preliminaries: Preparation of final preliminary plans, drawings and supporting written materials including but not limited to the items above.

OBJECTIVES AND SCOPE OF FEASIBILITY STUDY [2]

Of the objectives cited for the Design study, the most easily realized is the design aspect. There is no question that an elevated pedestrian way incorporating a movement system can be designed in an aesthetically pleasing and functionally acceptable manner as long as planning is based upon the human factors involved and not upon machine factors alone.

The most elusive objective during the course of the study has been the determination of the urban design implications and identification of the various pressures exerted upon corridor alignment possibilities, and of movement system position.

Realization of such a pedestrian system will lend great development impetus to adjacent and related properties. Alignment of the system cannot be based upon visual aspects, user, microclimatic conditions or system constraints alone, but must take into consideration that economic and urban growth patterns are of prime importance insofar as the study deals with the transportation fabric of the city - one of the very basic tools of urban planning.

For this reason, in presenting the proposal, it is necessary that a background indicating the framework and attitudes within which the study was conducted be established.

The following are excerpted or paraphrased from THE LAB IS THE CITY, A PROPOSAL TO DEVELOP A CENTRAL DISTRIBUTION SYSTEM, May, 1968, and BOSTON CENTRAL BUSINESS DISTRICT PLANNING REPORT, Victor Gruen, October, 1967.

THE LAB IS THE CITY,
A PROPOSAL TO DEVELOP A
CENTRAL AREA DISTRIBUTION SYSTEM
Boston Redevelopment Authority, May, 1968

(Excerpts)

SUMMARY OF PROPOSAL

This report is part of a proposal for evolution of a system for the distribution of persons in central Boston. This evolution is to be accomplished by Immediate Action, Research and Development and establishment of Long Range Goals. It is intended that the effort be of immediate service to the people of Boston and also provide a real-life prototype for consideration by other urban areas.

Immediate Action Project

It is proposed to install a system of moving sidewalks totaling approximately 4,000 feet in length in the South Station and Summer Street Renewal Project Area. This installation will provide distributory service to many thousands of persons travelling to and through this project area and will provide a real-life demonstration of this particular type of equipment and service. The moving sidewalk was selected for study because it was the only specialized form of mass transportation which had been fully developed and tested in other applications, and which appeared to present service characteristics which best fit this particular distribution problem.

Research and Development

This report is part of a study program to develop a better understanding of transportation service needs of the Central Area and the proper equipment to provide such service. The primary aim is to develop specific proposals for additional immediate action projects. It will include consideration of extension of the moving sidewalk as well as the possible use of other equipment.

INTRODUCTORY ANALYSIS

The Central Area of Boston has the greatest concentration of transportation facilities in the metropolitan area, but there are still portions of the Central Area which are unserved or poorly served, particularly by the mass transit facilities. Walking distances from many transit stations in the core area to areas of intensive use are unreasonably long and inconvenient.

About half of the average weekday trips to the Central Area are made by automobile. Many motorists seek destinations within the Central Area on a system of streets which are inadequate to handle large volumes of automobile traffic. Destinations of these motorists are the parking lots and garages which are distributed throughout the core area. These motorists create street congestion and contribute to an unsafe and unpleasant pedestrian environment.

Purpose

The purpose of the Central Area Distribution System would be to provide a supplementary means of transportation to distribute people to and from public and private transportation terminals and to circulate people within the Central Area. The system should solve specific distribution problems and should help achieve planning and design objectives for th Central Area.

Problem Statement

The distribution problems of the Central Area are associated with the pedestrian, the exist-

ing transit system, and the automobile and street system. Primary pedestrian problems which a Central Area Distribution System should alleviate include:

[1] Unreasonably long walking distances from transit stations and parking garages to major destinations within the Central Area;

[2] Confusion and lack of clarity of existing pedestrian routes within the retail core and financial district;

[3] Overcrowded sidewalks in high intensity use areas which ar times force pedestrians to walk among cars in the streets;

[4] Heavy volumes of traffic which form barriers to pedestrian movement;

[5] Unattractive and unpleasant physical environment for the pedestrian in many portions of the Central Area.

Transit problems which should also be alleviated by a supplementary distribution system include the following:

[1] Poor service to some portions of the Central Area from existing transit lines and stations;

[2] Unpleasant crowding of some stations in the Central Area;

[3] The necessity of making two or more transfers to reach some portions of the Central Area;

[4] Long waiting time, particularly in off-peak periods and circuitous access between underground facilities which is too time consuming and out-of-scale for short intra-core trips.

For half of the people who now enter the Central Area by automobile, there are also problems which should be alleviated by a supplementary distribution system:

[1] The over-taxed capacity of the street system due to the number of automobiles seeking centralized parking destinations;

[2] Excessive travel time from some parking facilities to ultimate destinations.

Objectives of a Supplementary Distribution System

The primary objectives of the Central Area Distribution System should be to:

[1] Increase the accessibility of more destinations from more origins within the Central Area;

[2] Integrate new distribution systems with the existing transit and automobile systems;

[3] Reduce the number of motor vehicles circulating within the Central Area;

[4] Maintain and improve the pedestrian character of the Central Area;

[5] Improve the clarity of movement within the Central Area;

[6] Decrease the need for additional parking facilities in the core area over a long term period.

Immediate Action

If the premise of the CADS Study "The Lab is the City" is to be carried out, it must develop an immediate action demonstration project. This project must satisfy all the above objectives and have the following characteristics:

[1] Consistent with the broad, long run aims of the City and with regional transportation plans;

[2] Useful in and of itself if no further projects are committed;

[3] Small enough to try as a demonstration project;

[4] Useful in demonstrating some principle of significance beyond the confines of Boston.

AREA OF CONCERN

The area of concern is the Central Area of Boston. In defining its limits, the following criteria were applied:

[1] The Central Area is a very specialized environment, offering many services that are not economically feasible elsewhere, and dependent upon good access to a sufficiently large population to support these unique services;

[2] The Central Area is the one area of the city most accessible to different kinds of people, integrated economically and ethnically. This is a unique aspect which represents a very significant part of the total environment of society;

[3] Access to the Central Area from any other particular area is the key through which people using that area can also enjoy the use of the Central Area. Conversely, the nature of access to the Central Area is a factor which in the long run affects the desirability and existence of development in a particular area;

[4] The Central Area is the area which produces a high level of tax return through its high intensity of use, which return is basic to maintaining the quality of the environment in the rest of the city.

Definition: Central Area

The Central Area is that part of the City of Boston lying within the proposed Inner Belt Expressway, including primarily the Boston peninsula, plus the major medical center area in the Fenway.

Functionally, the Central Area may be defined as that part of the City containing, or potentially containing, the bulk of regionally, rather than locally, oriented activities. It includes the Central Business District, with its retail core, government, financial and business and professional services as well as several varied residential neighborhoods such as Beacon Hill, North End, Chinatown, Bay Village, Back Bay, South End and the Fenway. In addition, major medical, educational and cultural institutions of the Boston area is the focus of the region's rapid transit and highway systems.

Definition: Specific Sub-Areas

Five specific sub-areas of the Central Area have been identified as areas to be closely examined in relation to the relative inadequacy of existing transportation facilities. Two of the sub-areas are in the Central Business District and the remaining sub-areas are strongly influenced by the regional importance of the Central Business District.

BACKGROUND

The transportation systems of today have evolved from those of the past. This evolutionary process, which involves a continuing period of testing followed by rejection or acceptance and then more testing, is the only sure way further progress will be made. Meanwhile, it is essential to provide the services which are needed now and tomorrow for the purpose of daily living.

'remise: THE LAB IS THE CITY

'esting can be done in many ways. The heoretical study, in which a priori logic is ipplied to assumptions and factors in an ittempt to predict outcome, is one valid nethod of providing insight as to what might vork in the next step of the process. The :ollection of data concerning present activi- ies and translation into characteristics and rends which are then further refined into imulations is also used. Construction and ohysical testing, first of models then of life- ized prototypes, is employed. In the final inalysis, however, these do not substitute out only complement or lead up to the real ife test in which the service is provided to hose for whom it is intended and studied vhile in actual use. Substantial increase in his latter activity is essential if the evolu- ion of urban transportation is to be acceler- ited into a level of performance and service iot heretofore provided. For real progress n this field, we must take the attitude that 'The Lab is the City" and get on with the ob from that approach.

;cope

'he CADS report was developed to show the vay that the City of Boston might make itself ivailable to be a leader in the evolution of iew transportation services. It is limited to one segment of the overall transportation ystem: that of distributing persons to their inal destinations in the highest density, nost active part of the city. This limitation vas imposed because there are metropolitan ind statewide agencies more rightfully con- :erned with the problems of moving persons o and from the various areas of the city and netropolitan area. Because of their more jeneral responsibility, those agencies cannot olace high priority on this specialized pro- olem. Finally, it seems evident that the listribution problem, even though unques- tionably related to the overall transportation network and bound to have influence on its use, is closely related to the activities of those who live and work and maintain proper- ties in the central city; all of which is a proper concern of the City of Boston.

CADS PROPOSAL

Problem

The moving sidewalk study area is one of 5 sub-areas of the central area that have inad- equate distribution service. Development in this area is creating points of concentration of arrival which do not and cannot coincide in all cases with final destinations. It is a misuse of the primary delivery system (rapid transit and highway) to expect it to provide fully adequate distribution.

[1] Rapid transit in this area can only effect delivery via an excessive two transfers.

[2] Use of the highway system overcrowds the central streets with vehicles attempting delivery to points of final destination.

Alternative:

A realistic substitute for misuse of the primary distribution system is walking (pedestrian). Walking is and should be one of the major elements of a distribution system, especially in areas which have been specifically deve- loped to accommodate the pedestrian in appropriate surroundings. Often the walk is longer than people can be expected to enjoy and through areas difficult to traverse on foot. It was the finding of the CADS report that another distribution system was needed. This new system is directed toward relieving the basic network of the overall distribution function and supplement the pedestrian mode in areas where walking is not appropriate or easy.

The City as a Laboratory

It is the initial premise of the CADS study that the city be used as the laboratory, through the medium of immediate installation and testing, if new transportation services are to be evolved. Implementation must be carried out in context with the needs of the city, the status of development of the city, and the availability of equipment to provide needed service.

Immediate Action Program

The South Station Retail Core Development Area is selected as the area for immediate action. It is proposed that a full-scale demonstration project using moving sidewalks for service be installed in this area. The area was selected because the need has been demonstrated and because it is scheduled for immediate redevelopment, thereby making it possible to include a special distribution system as a portion of this redevelopment.

The South Station Terminal has already been acquired by the BRA for renewal purposes and a developer tentatively designated. A fully outlined renewal plan for South Station and the immediately adjoining Summer Street area is now in preparation for the accomplishment of this purpose. The remaining sector of the Summer Street Area which is included in this action proposal has been identified as one of the most critical for renewal activity as soon as a project can be developed and approved. Furthermore, the renewal of South Station and Summer Street is an integral part of an overall Central Business District Plan, thus assuring that action here is compatible with all development goals for the area.

The CADS Study of the distributive needs of the users of the South Station - retail core area, and comparison with the characteristics and availability of special distribution equipment, led to the conclusion that a continuing series of moving sidewalks is the proper immediate solution for the area.

The CADS report saw the moving sidewalk system as a set of moving belts laid end-to-end in pairs for two-way movement. Provision would be made for the system to begin at the southernmost end of the garage, extend to the intersection of Summer and Chauncy Street, which, in the overall CBD Plan, is the beginning point of the retail core pedestrian area which is to be specially designed for the proper accommodation of the walking mode.

The over-all system would be 3,900 feet in length with intermediate access and distribution points. The needs of persons arriving at South Station by automobile, bus, train, and transit would be served as well as those travelling to and from intermediate points along Summer Street. The system would be entirely above street level and encounter no motor vehicle conflicts. It would be entirely sheltered within buildings or within its own cover where it passes over streets to negate any climatic problems.

BOSTON - CENTRAL BUSINESS DISTRICT PLANNING REPORT
Prepared for the Boston Redevelopment Authority and the Committee for the Central Business District by Victor Gruen Associates, October 1967.

METROPOLITAN AREA:

The CBD is the focus of a sprawling metropoliton area of 149 cities and towns with a 1960 population of 3,346,000. The geo-political delineation of the area includes:
[a] SMSA - urbanized area
[b] City of Boston
[c] The regional core - area circumscribed by proposed inner belt
[d] Downtown - linear 'hockey stick' shaped area from Kenmore Square, Back Bay, the CBD to North Station
[e] CBD - although statistically inaccurate for the purposes of this report, the boundaries of the CBD and the CBD Urban Renewal Project are considered coterminous.

The City of Boston now represents only 20% of the region's total population and has suffered from a marked decline in population, industry and sound housing units since 1950. Development program proposals for rehabilitating or replacing the 50,000 deteriorated or dilapidated housing units along with new increases in the housing stock should help to reverse the current trends. New sites for commerce, industry, schools and various community facilities, the reclamation of water frontage and creation of new sites for recreation, and comprehensive improvements and clarification of transportation systems will support the larger urban renewal efforts in housing.

Inasmuch as the CBD represents the focal point of the entire Metropolitan Region, the success of its revitalization depends on 'accessibility' and on the development of all other areas within the Metropolitan Region in a manner sympathetic to the aim of its revitalization. This is true for the rest of the Regional Core, the development of the Core fringe, and for the development of the remaining urbanized and suburbanized areas in the Metropolitan Region.

Due to the existence of this interdependence, planning goals cannot restrict themselves to the project area, but have to be extended to include all influencing factors within the Metropolitan Region. The planning goal of revitalizing the CBD could not be achieved without assurances for satisfactory solutions of problems referring to areas lying outside the CBD area.

APPROACH:

A new functional pattern for the CBD must be created with the aim of achieving a maximum of compactness, separation of utilitarian from human functions, creation of high productivity potential, fluid communications, and a practical system for the distribution and delivery of goods.

The Metropolitan Core of Boston is too large and complex to permit a planning approach similar to those used for smaller cities like Fort Worth or Cincinnati, where the Core area was designed as one tightly knit nucleus completely reserved for pedestrian movements and surrounded by transportation facilities consisting of loop roads, garages and mass transportation terminals.

A different approach has been developed for the CBD not only because of its greater size, its greater economic potential and its historic characteristics, but also because in contrast to younger cities, Boston's core fringe is fully developed. Another significant difference between Boston and other cities with CBD development programs is that Boston possesses an excellent network of rapid transit, whereas other cities must rely on buses.

"We're led to a different planning approach for Boston which fits its needs and provides the proper balance between the old and the new. The separation of utilitarian from human functions is fundamental to our approach."

PLANNING GOALS FOR THE CBD:

The goal of the program is the economic, physical and cultural revitalization of the central business district, specifically to:

[1] Capitalize on the historic, educational, recreational and environmental assets of the core area and the Boston metropolitan region ;

[2] Encourage the establishment of a strong supporting framework outside the core for;
   a. Improved mass transit and vehicular access;
   b. High density residential districts;
   c. New industrial, wholesale and institutional development sites;

[3] Correlate the existing and proposed land uses and activities in the Central Business District project with adjacent functional areas;

[4] Create a system of public improvements based on the principle of separation of vehicles and pedestrians, including:

a. Vehicular circulation - movement of service vehicles, taxis, buses and private vehicles;
b. Mass transportation - station remodeling, platform extensions and alterations, track and signal modernization;
c. Goods service - specified rights-of-way for trucks, underground dock and distribution systems, centralized scheduling;
d. Parking - location of public and private structures within and at the edge of the core for both short and long term usage;
e. Public open space - small urban parks and plazas plus specialized pedestrian areas and arcades for shopping and business use.

[5] Consolidate and strengthen the retail, office and financial areas within the project boundaries through rehabilitation;

[6] Provide new investment opportunities through the acquisition and demolition of substandard structures and the assemblage of small properties into large parcels in those areas characterized by deterioration, blight and functional obsolescence ;

[7] Coordinate the program of acquisition, clearance and redevelopment to achieve private redevelopment and public systems improvements simultaneously;

[8] Perpetuate the high density - multi-use character of the area by encouraging residential, office and public uses above and around the retail district;

[9] Improve the overall environment characteristics of the area to encourage greater resident, business and tourist populations.

THE CENTRAL BUSINESS DISTRICT PLAN CONCEPT:

Boston's Central Business District is visualized as a cluster of urban sub-areas. Each sub-area, by its size, shape and density of activity, would be suitable for pedestrian use. Vehicular traffic within these areas would be held to a minimum for autos to and from existing or new garages, and for truck loading facilities.

Each area is to be circumscribed by traffic streets, facilitating the movement of automobiles bound to garages, taxicabs driving to loading and unloading stations near entrances to the pedestrian areas, and trucks and service vehicles bound to loading and service facilities. South Station (Summer Street to Fort Point Channel) and Summer Street (Chauncy to South Station) are indicated as sub-areas.

The principle underlying the plan is:
[1] Improved accessibility to the City core area by private and, particularly, public transportation;
[2] Separation of utilitarian and vehicular functions from human functions by means of vertical or horizontal separation;
[3] Improvement of the environmental qualities of the business core area;
[4] Addition of new economic strength and development sites;
[5] The mixture of business activities with other urban functions including apartments, entertainment, Government, cultural and social institutions, etc.

Boston is an old city and therefore its historic buildings and streets offer special opportunities, but also present unusual problems. An important goal of the Plan is to preserve historic structures and the traditional city scale, and to free the narrow business streets and lanes from automotive vehicles for which they never were designed.

The plan proposed to liberate streets and lanes from traffic jams, noises and exhaust gases; to return them to the use of people on foot; to make shopping and all other urban activities pleasureable again, through development of systems of underground delivery streets and docks, and a major terminal for cars, buses and trains in the South Station area.

PLANNING OBJECTIVES:

Summer Street (Church Green)

[1] Combine the need for new streets and other public improvements with the need for comparative shopping facilities, office space, parking and pedestrian areas

[2] Establish a system of parking and commercial structures with interconnecting access ramps, bridges and pedestrian walks so that parcels may be developed individually, yet where combined will form a continuous structure and pedestrian route

[3] Retain a high degree of flexibility in the land use and building controls to permit a wide range of development solutions

[4] Encourage multi-parcel development with concurrent construction phasing, thereby achieving architectural unity and a continuity of public improvements

[5] Reserve space within buildings or a special area for convenience services to shoppers such as meeting rooms, rest spaces, credit establishments, amusement facilities, nursery and child care, delivery service, package storage, automobile service, pick up, etc.

South Station (Transportation Terminal)

[1] Provide modern transportation facilities for railroad, bus, parking, shuttle bus, MBTA helicopter and taxis in a coordinated series of structures permitting air rights for commercial uses.

[2] Provide all weather pedestrian areas which interconnect all facilities and which link the transportation facilities to the proposed Summer Street complex and to the financial and retail district.

[3] Route a shuttle bus through pedestrian areas to interconnect all transportation, parking and commercial facilities.

[4] Provide high speed access ramps and connections from parking facilities to the Massachusetts Turnpike, the Central Artery, Dorchester Avenue and Atlantic Avenue.

[5] Design the parking structures in modules of not more than 1000 spaces to permit a staged construction program and to minimize driver confusion and traffic congestion.

[6] Establish a rate structure for parking which will encourage all day employee usage.

[7] Rebuild South Station passenger terminal with smaller but adequate accommodations and with direct connections to vehicular drop-off stations, parking facilities and the MBTA.

[8] Encourage day and night-time commercial activities of a service nature, which will not compete with the retail core.

[9] Encourage sales and displays of automobile, airplane, boat and sporting goods products.

[10] Encourage a variety of transient accommodations for conventions, meeting and display as well as for hotel and apartment uses

[11] Provide adequate flexibility in street, ramp, parking, pedestrian, and shuttle bus design to accommodate the extension of facilities to the proposed stadium site.

BOSTON/DOWNTOWN STUDY Summer 1969
Boston Redevelopment Authority

The public framework study was undertaken in response to the problems created by an unprecedented acceleration in the growth of downtown Boston. The contribution of the study toward the solution of these problems is in the form of a set of principles to guide the growth of and their application in an illustrative development plan for downtown Boston.

The study has its origin in the very apparent conflict between recent high rise office developments and Boston's valued traditional urban fabric.

It was the objective of this report to produce a design and development plan that would accommodate new development and at the same time maintain Boston's historical and architectural heritage, and enhance its compact "walking city" characteristics.

The immediate and practical function of this development plan is presumed as a supplement to the present zoning code and urban renewal controls, and as a springboard for further study of the future of downtown Boston.

In response to the 2 overriding objectives of maintenance of the historical urban fabric, and full realization of Boston's "walking city" potential, both within the context of effective development, two sets of principles were developed.

(1) The Principle of the Development Envelope
(2) The Principle of the Public Framework

The term "Development Envelope" is used in the sense of land use and their corresponding building envelopes. It is the function of the principle to insure that the new development is integrated, in terms of physical form, into the existing urban fabric with a minimum of conflict, in functional, visual, and environmental terms.

"Public Framework" is intended to enhance Boston's "walking city" character, and to realize the full pedestrian potential inherent in the compact form of the downtown. It assumes public investment in public facilities, commensurate with the degree of existing and projected public demand for those facilities. A development plan was generated for the downtown through the application of the public framework principle. (Refer original document.)

Illustrative materials developed in the "Boston/Downtown Study" along these 2 principles has been included within the moving sidewalk study by way of illustrating general overall traffic conditions, and the public framework principle as applied to downtown Boston in that study. Development of the Summer Street Pedestrian corridor is complementary to the public framework model concept of that street as a primary corridor with protected pedestrian way within an overall framework.

SECTION 3 CORRIDOR STUDY AREA

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Aerial Photo - CBD and Study Area

PLATE 3-I

The Study Area (Plate 3-I and 3-3), identified as a major area of concern in central Boston, was selected because a serious distribution need had been demonstrated, and because immediate redevelopment was scheduled, making it possible to include a special distribution system as part of new construction. The South Station terminal had already been acquired by the BRA for renewal purposes, and a developer tentatively designated. The remaining sector of the Summer Street area was recognized as one of the most critical for renewal activity.

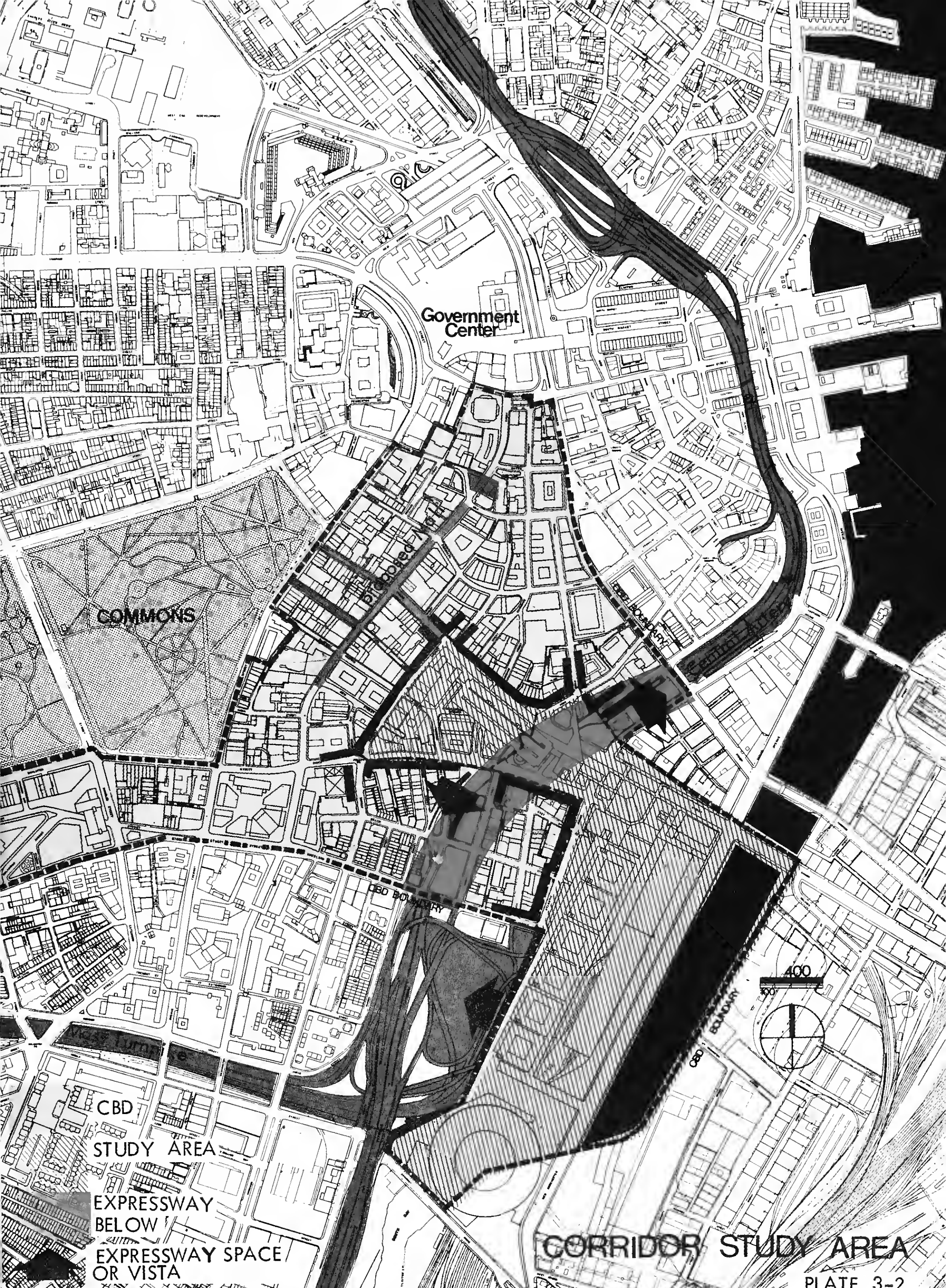
Characteristics and needs of the CBD within which the study area is centered are outlined in the previous section; site conditions and traffic relationships follow.

STUDY AREA - GENERAL IDENTITY

PRESENT SITE CONDITIONS ARE EXTREMELY DIVERSE, UNPLANNED AND POORLY RELATED, AND OBVIOUSLY UPON SIMPLE SITE INSPECTION PRESENT SERIOUS DISTRIBUTION PROBLEMS, BOTH FOR PEDESTRIAN AND VEHICLE. THE CENTRAL ARTERY HAS EXERTED CONSIDERABLE ADVERSE INFLUENCE UPON STREET AND BUILDING PATTERNS, CUTTING A WIDE SWATH THRU THE URBAN FABRIC OF THE AREA, LEAVING A MAZE OF INTERSECTIONS WHICH MUST COPE WITH THE ADDITIONAL TRAFFIC INTRODUCED BY ARTERY ACCESSES AND EGRESSES. THIS SWATH IS AN EFFECTIVE NO-MAN'S LAND BETWEEN RAIL, BUS AND TRANSIT FACILITIES AT THE SOUTH STATION AND DISTRICTS ON THE WEST SIDE OF THE ARTERY, IN ADDITION TO DIVIDING CENTRAL AREA DISTRICTS FROM EACH OTHER.

EXISTING BUILDINGS IN THE AREA ARE IN VARIOUS STATES OF REPAIR AND THE OVERALL TEXTURE OF THE AREA OPENLY SUGGESTS THE NEED FOR RENEWAL.

CONSOLIDATION OF LAND PARCELS AND REPLANNING OF SURFACE STREET PATTERNS AS PROJECTED IN PRESENT RENEWAL INTENTIONS, COMPLEMENTED BY A PEDESTRIAN DISTRIBUTION SYSTEM, WILL CONTRIBUTE CONSIDERABLE TOWARD KNITTING THE CENTRAL AREA OF THE CITY TOGETHER AGAIN, AND ENCOURAGE ITS REVITALIZATION.


Government Center
COMMONS
Proposed Mall
CBD BOUNDARY
Central Artery
Mass Turnpike
400
CBD
STUDY AREA
EXPRESSWAY BELOW
EXPRESSWAY SPACE OR VISTA
CORRIDOR STUDY AREA
PLATE 3-2


STADIUM
Grill
BAKER
PHARMACY

[Top-left] Illustrative of the contrast between old and new looking north from Summer Street near South Station. The Central Artery cuts below the surface streets with major access-egress to this location.

[Top-right] Looking West on Summer Street from the High Street intersection. Illustrative of the texture of buildings, and the traditional diverging street pattern. Urban renewal and consolidation of land parcels will recreate this vista, repositioning Summer Street widened to a major Corridor scale to the left with a straight alignment between this corner and the proposed Mall

[Center-left] Looking South from the north side of Summer Street at Purchase across the 'no-man land' at Dewey Square cut by the Central Artery below.

[Center-right] The Dewey Square intersection looking toward Summer and Federal Streets.

[Bottom-left] Looking north up the Federal Street axis toward the post office terminus from South Station.

[Bottom-right] Looking north on Atlantic Aven from the Kneeland Street intersection. South Station is on the right, with Leather District docking and service areas on the left.

[Note: These photographs were taken October, 1970 at approximately 3:30 prior the peak hour commuter entered the streets.

EXISTING FUNCTIONAL AREAS: Boston is divided into defined and recognizable functional areas, a result of historical development and zoning. Recent private development has been confined to the financial and insurance districts, with very little private activity occuring in retail, entertainment or wholesale areas. The completion of Government Center and the proposed construction of the South Station Transportation Center area bring into question the future of the Graphics Arts Industry, and the Wholesale furniture, leather and garment districts as presently known. Proposed new construction coupled with the gradual decrease and redistribution of these activities to other parts of the Region is having a decided effect on the character and form of these districts. Incompatibilities in some land uses is reduced while concurrently increasing the potential for interaction between others.

The Corridor study area forms a'seam' between several such functional sub-districts: Retail Core, Financial District, Leather and Garment Districts, with the potential for linking the East side of the Channel to the CBD.

Study Area

Existing Functional Areas Boundary

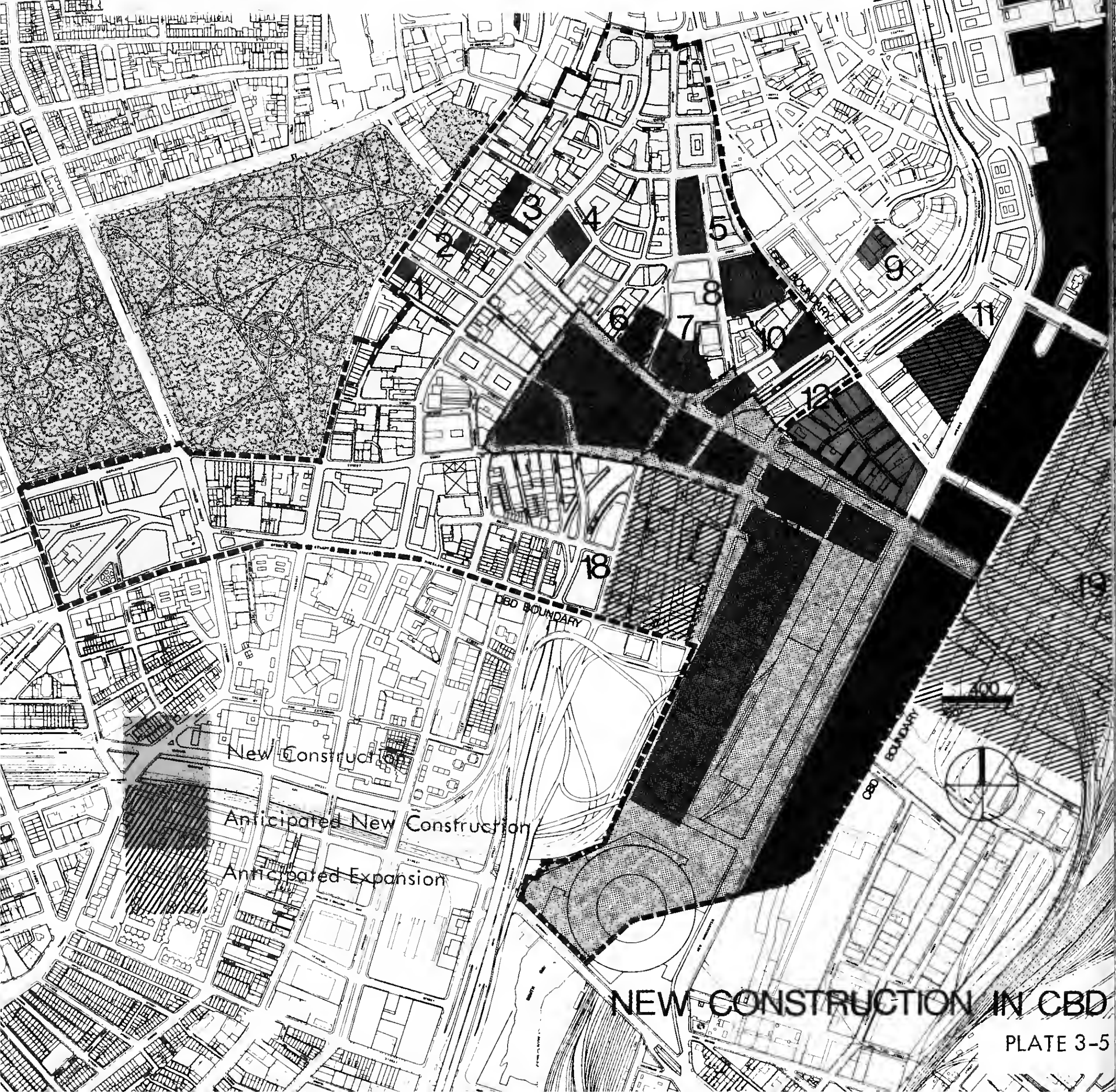
CBD

EXISTING FUNCTIONAL AREAS

PLATE 3-4

At the present time these sites are marked for new construction, are under construction, or are undergoing active investment pending anticipated development:

(1) Wasserman
(2) Provident
(3) Retail
(4) Retail
(5) Shawmut Bank
(6) Commercial
(7) Blue Cross - Blue Shield
(8) First National Bank
(9) Travelors Building
(10) Keystone Building
(11) Sheraton Site
(12) Federal Reserve
(13) Retail
(14) Retail
(15) Dewey Square Low Rise
(16) Dewey Square Tower
(17) Transportation Center
(18) Leather District Expansion
(19) East Bank Development
(20) Commercial



NEW CONSTRUCTION IN CBD

PLATE 3-5

MAJOR PERMITTED USES

PARCEL	AREA SQ FT	COMMERCIAL	RESIDENTIAL	TRANSIENT HOUSING	OFFICE	PARKING
A-1c	20,000				●	
A-2	6,000				●	
A-3	3 400				●	
A-4	13 500					
A-5	27,500				●	
A-6	58 000	●				●
A-7	6.000	●			●	
A-8	25,500	●			●	●
A-9	9,600	●			●	
A-10	5 000					
A-11c	31,500	●			●	●
A-12c	37 500				●	
B-1	80,000	●	●		●	
B-2c	21 695	●			●	
B-3c	36 243	●	●		●	
B-4c	45 902	●	●		●	
B-5	10 000	●			●	
B-6c	37,664	●			●	
B-7	12,000	●			●	
B-8c	12 626	●	●		●	
B-9c	23 472	●	●		●	
B-10	67,000	●	●		●	
B-11c	13 606	●			●	
C-1	4,700	●				
C-2	3 000	●			●	
C-3	30,000	●			●	
C-4	59 000	●			●	●
C-5c	18 500	●			●	
C-6c	19 000	●			●	
C-7	4 400	●			●	
D-1	40,000	●			●	
D-2	60 000	●			●	●
D-3	23 000	●			●	
D-4	18 500	●			●	
D-5	104 000	●				●
D-6	35 000	●			●	
D-7	48 000				●	
E-1	100 000	●			●	
E-2	54 000			●		
E-3	700,000					●
E-4	200 000	●				●
F-1	27 000					
F-2	27 000	●				
F-3	27 000				●	●
F-4c	29 000				●	
F-5	20 000					
F-6	3 800	●			●	
G-1	102,000	●			●	●
G-2	167 000	●	●	●	●	
G-3	8,000					
H-1	7 800	●			●	
H-2	5 700	●				
H-3c	34 000	●	●	●	●	
H-4	77 000	●	●	●	●	

0 200 Feet

N

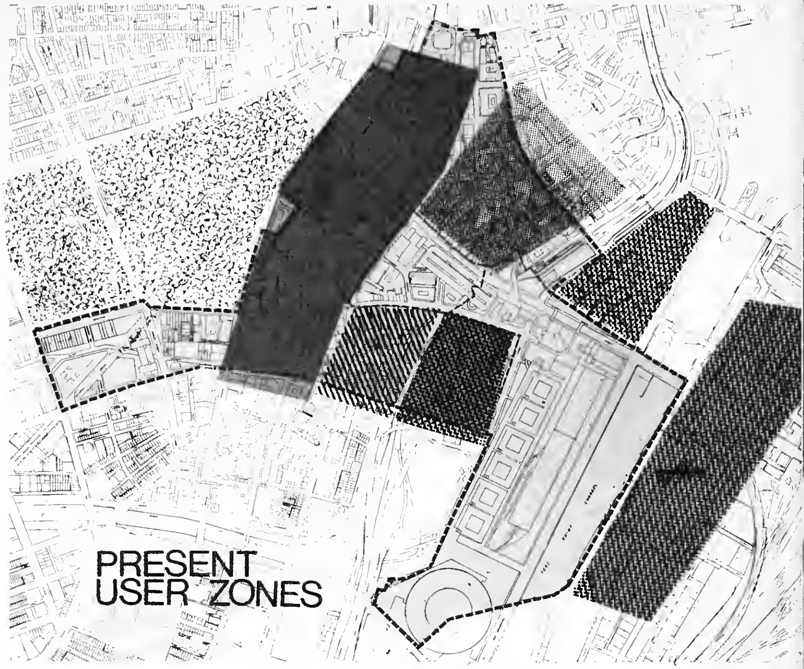
DISPOSITION PARCELS

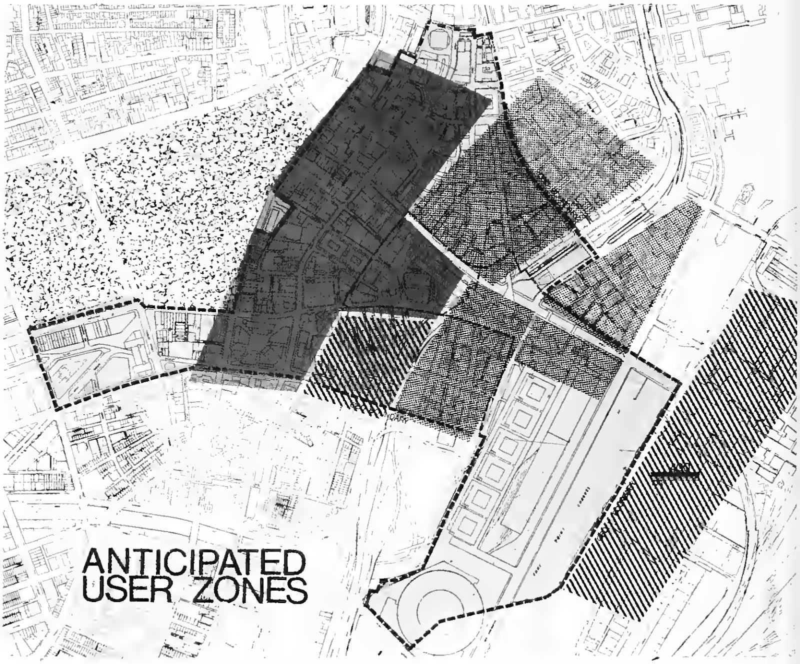
PLATE 3-6

New Construction in the CBD: At the present time the sites indicated in Plate 3-5 are marked for new construction, are under construction, or are undergoing active investment pending anticipated development. Disposition parcels are outlined in Plate 3-6.

User Zones: The effect of extensive new construction and change in the Central area appears to result in sub-district concept. Plate 3-7 is a generalized building use diagram which can be interpreted as a 'user' diagram. The office area, for example, will, relative to the proposed pedestrian Corridor, contribute heavily as the commuter generator; the retail use area would act as a continuous demand generator; and the industrial use area could be expected to contribute in a minor way both as commuter and continuous demand. The study area is opportunely situated to attract a variety of pedestrian 'user' types, whether commuter or continuous demand of noon-hour, by its position between these generalized areas. This Corridor position has inherent potential for increasing interaction and accessibility between sub-districts, as well as supplement the distribution mode.

Sub-Areas: The implication of the shift in user zones (PLATE 3-7), coupled with new construction patterns and the proposed pedestrian Corridor with its moving walk, is that the CBD as presently known, is expanding from its historic sub-district enclaves into a more homogeneous 'Central Area' primarily devoted to retail and office occupancy. Present sub-districts are closely related to, and their size a function of the walking mode. Their scale is associated with walking distance. The new larger sub-district 'Central Area' exceeds traditional pedestrian scale. Its cohesiveness will largely be a function of increased pedestrian accessibility and distribution.





CBD

RETAIL

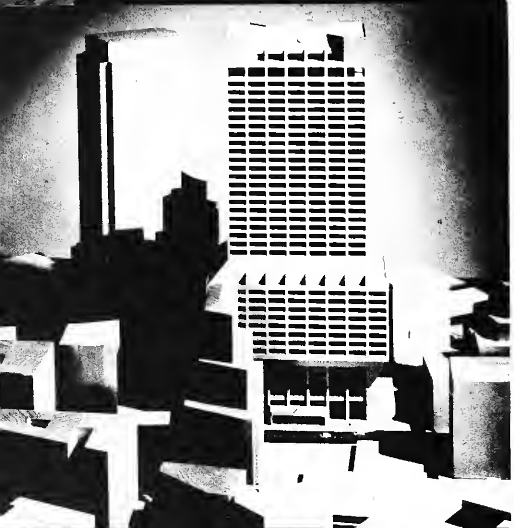
OFFICE

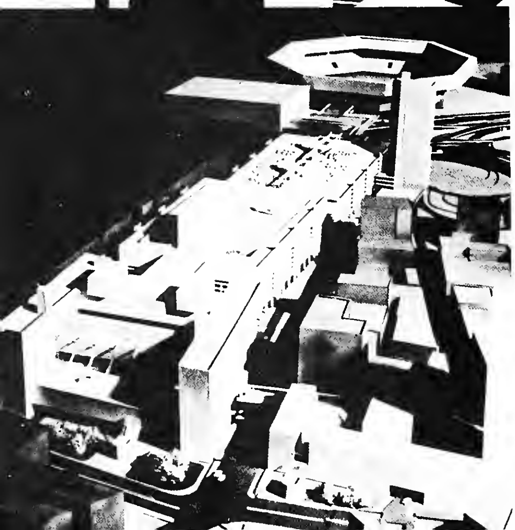
MIXED

LIGHT INDUSTRY

USER ZONES

PLATE 3-7





THE NEW BOSTON: Patterns of development anc extensive change within the CBD are creating a 'New Boston' with a decidedly different scale anc character. As can be seen in the cover plate, th type, age and condition of buildings in the CBD is widely varient. It is an area of narrow and bending streets with limited vistas, and in the pre sent state of transition, presents an overall impression of disorientation and confusion. Major n construction is creating a striking new focal orde of high density sub-centers rising from the traditional lower height buildings, promising a new pattern with strong urban character if the frequency of major vertical construction can be regu lated and the lower massing preserved against the winding streets. Sense of scale must be recognized as a strong design criteria within the CBD. Distinct separation of vertical and horizontal mas sing can achieve effective integration of these scales. The memory of the old will remain in the area by necessity of the bending street pattern, a the preservation of various historic buildings, enclaves or districts.

Pedestrian scale has been traditionally defined by existing streets and the old scale. New vertical centers and the enlarged CBD [page 3-10] necessitate a new pedestrian scale sufficient to serve increased volumes and expand district accessibility. The pedestrian distribution system must respond to this new scale, while simultaneously realizing its potential as a most tangible means of knitting together the old and the new.

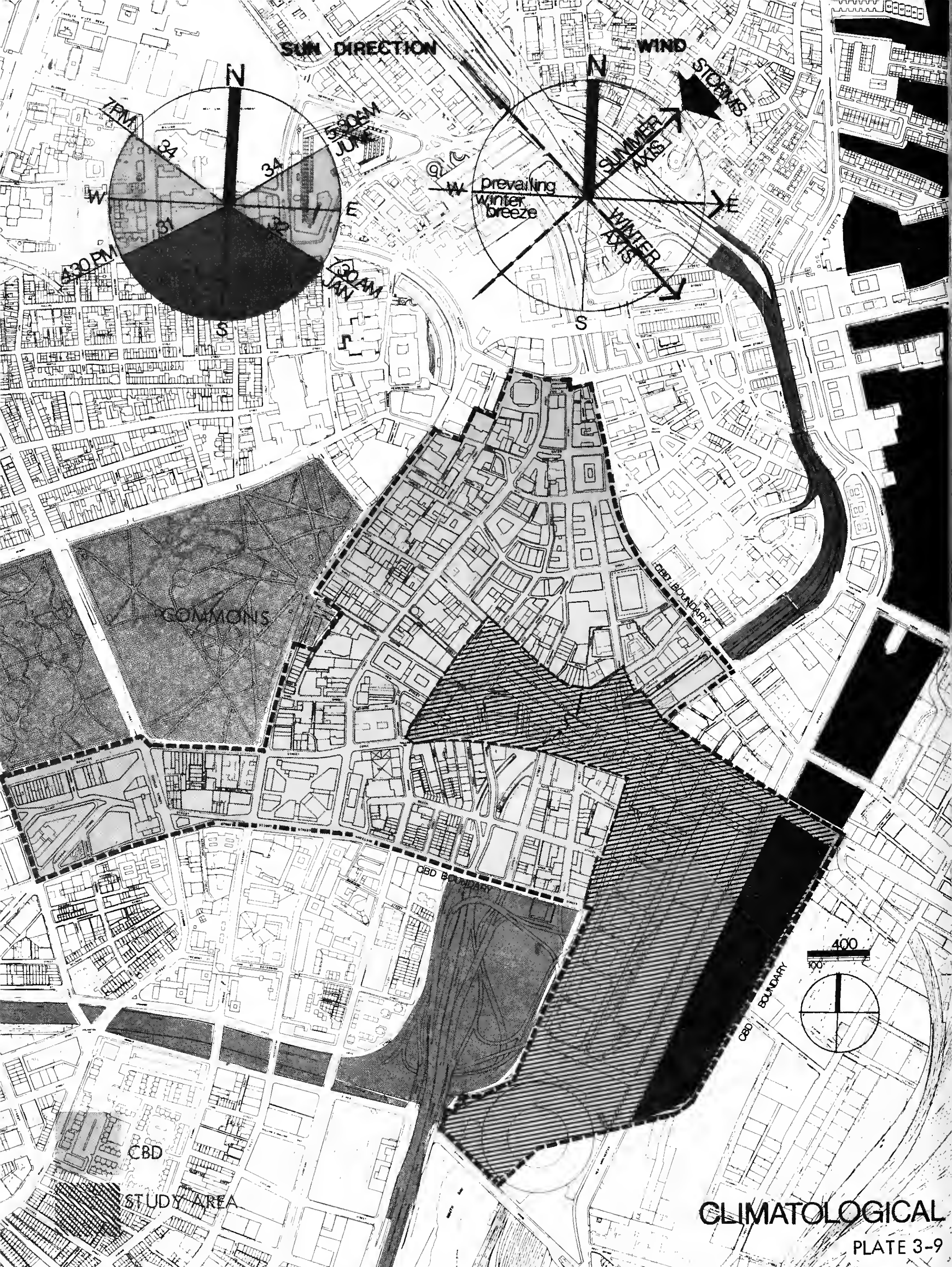
[Top] Photo of BRA study model looking North illustrative of the new vertical sub-center pattern developing within the CBD.
[Center] Illustrative of new towers within the CBD First National Bank of Boston's unusual 40-story office tower on Franklin Street, with the recently completed State Street Bank Tower seen behind.
[Bottom] Photo of a model of the proposal for a ne $75 million Trade and Transportation Center at South Station.

CLIMATE

Three important influences are responsible for the main features of Boston's climate. (1) The latitude (42 degrees N) places the city in the zone of prevailing west to east atmospheric flow in which are encompassed northward and southward movements of large bodies of air from tropical and polar regions, resulting in variety and changeability of weather elements. (2) Boston is situated on or near several tracks frequently followed by systems of low air pressure. Consequent fluctuations from fair to cloudy or stormy conditions reinforce the influence of the first factor, while also assuring a rather dependable precipitation supply. (3) Boston's east-coast location is a moderating factor affecting temperature extremes of winter and summer.

Hot summer afternoons are frequently relieved by the locally celebrated "sea-breeze", as air flows inland from the cool water surface to displace the warm westerly current. The severity of cold waves is reduced in winter, under appropriate conditions, by the nearness of the then relatively warm water. The average date of the last occurrence of freezing temperature in spring is April 8 and of the first occurence of freezing temperature in fall is Nov. 7.

Boston has no dry season. For most years the longest run of days with no measurable precipitation does not extend much more than two weeks, occurring at any time of year. Much of the rainfall from June to September comes from showers and thunderstorms. During the rest of the year, low pressure systems pass more or less regularly and produce precipitation on an average of roughly one day in three. Coastal storms, or "northeasters", are prolific producers of rain and snow. The main snow season extends from December through March. The average number of days with four inches or more of snowfall is four per season, and days



CLIMATOLOGICAL

PLATE 3-9

with seven inches or more come about twice per season. Periods when the ground is bare or nearly bare of snow may occur at any time in the winter.

Precipitation: An annual rainfall of about 43" rather uniformly distributed throughout the year but with considerable variation from year to year. Late spring and fall tend to have less than summer and winter. Slow evaporation in winter causes sustained muddy periods. Absorbent surface materials should be avoided and exterior materials should be resistant to staining. Care should be taken to prevent formation of icicles.

Snow: Average annual snowfall -- 43" with great variation from year to year. Maximum snow load is not likely to exceed 25-30 lbs. and averages 10 even in extreme conditions. Snow tends to accumulate in January/February between storms.

Wind: Boston is relatively windy because normal westerly winds are intensified by lower pressures over the ocean, especially in winter. Because of irregularity of landscape, there is considerable variation in local wind direction and velocity. Afternoons are windiest, evening and night calmest. Winter is windier than summer. March is the windiest month. August the least. Windbreaks should be placed to the west and northwest. Although winds of 32 m.p.h. or higher may be expected on at least one day in every month of the year, gales are both more common and more severe in winter.

The greatest amount of sunshine recorded in any month was 86% of possible hours; the least was 28% of the possible amount.

COMMENT: There is no question that sheltered pedestrian ways are particularly appropriate toward encouraging the increased use of the walking mode in Boston.

Snowmelting should be provided and icicles anticipated. Sun protection in summer is required. It is desirable that the corridor when located, take advantage of the cooling summer winds. Recommended placement of windbreaks on west and northwest sides of facilities appears inherent in the Summer Street section of the study area, although this area will be subject to the northeast storm axis. Because of the unpredictability of winds in the city, it is recommended that corridor planning permit wind barriers to that direction following demonstrated need. Unless the 'Dewey Square' area north of Summer Street above the Central Artery is developed, severe northeast winds could be funneled directly into a considerable portion of Summer Street. The Atlantic Avenue section, on the other hand, if its corridor is developed along the west edge, will sustain west summer sun and wind conditions.

GENERAL:

PEDESTRIAN ORIGIN-DESTINATION LINES IN THE CBD AND POTENTIAL CORRIDOR USERS WERE EXAMINED BY BOTH MURRAY D. SEGAL, TRANSPORTATION CONSULTANT, AND TAC IN VARIOUS WAYS.

TRAFFIC STUDIES YIELDED PEDESTRIAN TRAVEL PATTERNS DURING THE PEAK HOURS [SEE TRAFFIC DIAGRAMS FOLLOWING] AS ANTICIPATED VOLUMES ALONG A SUMMER STREET CORRIDOR. THESE VOLUMES ESTABLISHED A RECOMMENDED NUMBER OF BELT SEGMENTS FOR THE MOVEMENT SYSTEM AND STRONGLY SUGGESTED [1] THE PRIMARY CORRIDOR USER, [2] CORRIDOR ALIGNMENT POSITION, AND [3] CORRIDOR ALIGNMENT ALTERNATES.

TAC, IN AN EFFORT TO SUPPLEMENT STATISTICAL TRAFFIC STUDIES, AND TO IDENTIFY THE "CLIENT-USER", ATTEMPTED TO EXAMINE PEDESTRIAN ORIGIN-DESTINATION DESIRES GRAPHICALLY THROUGH THE USE OF AN OVERLAY DEVICE [E. G.- PLATE 5-5] SUPERIMPOSING THE PEDESTRIAN MOVEMENT IN VARIOUS RELATIONSHIPS WITH THE INTENT OF ESTABLISHING ACTUAL ROUTES A PEDESTRIAN MIGHT TAKE IN THE CBD FOR CERTAIN PURPOSES, - THE SYSTEM USER, AND THE FIELD OF INFLUENCE OF THE CORRIDOR.

TRANSIT
PLATE 3-10

Expressway
Expressway Tunnel
Major Arterial
Minor Arterial
Collector—Distributor
Minor Access Street
Parking: More than 3,000 Cars
Parking: Less than 1,000 Cars

Study Area
CBD

STREET HEIRARCHY AND PARKING FACILITIES

PLATE 3-11

Study Area Boundary

Indicates relative volume, not absolute volume.

CBD

Study Area

PEDESTRIAN VOLUME
DOWNTOWN BOSTON

PLATE 3-12

ANALYSIS: PEDESTRIAN TRAFFIC PATTERNS AND VOLUMES:

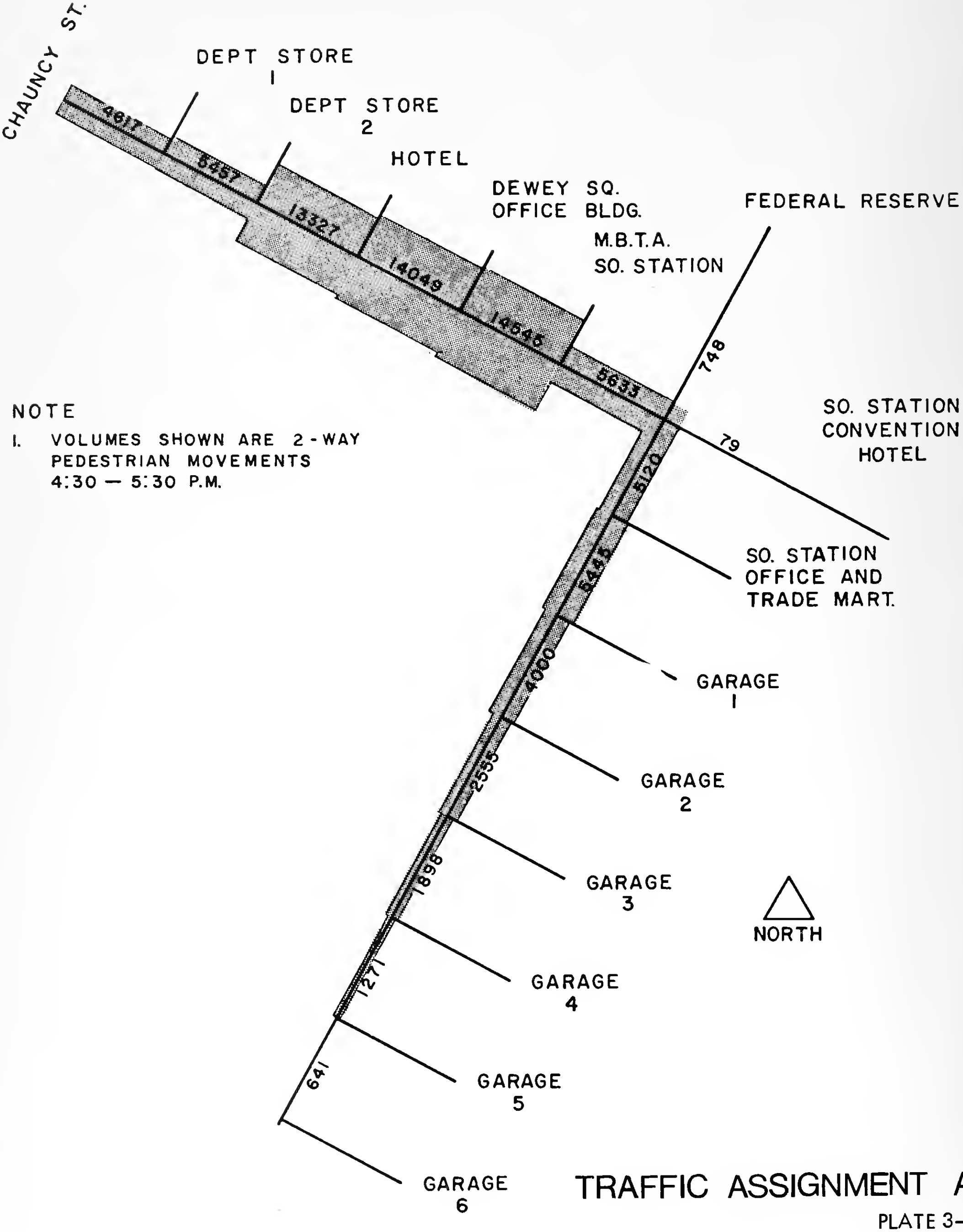
General: The study area designated falls on the southernmost edge of the densest pedestrian travel pattern during the peak hour. It parallels with the transit system by virtue of its physical constraints. Traffic studies did not differentiate the pedestrian as to type. Studies appear to substantiate a diversity of potential user types along Summer Street and a more singular pedestrian type [commuter] from South Station to the north via Federal or Congress Streets. Summer Street due to its physical characteristics and position relative to the retail core, transit generators and abutting districts, naturally collects a considerable diversity of user types during the course of a day, whereas Federal and Congress Streets are peak hour-commuter oriented, and other traffic is not singularly oriented.

Summer Street: [1] Greatest volume of users are transit destined; [2] Comparatively minor number of users [approx. 20-25%] are destined for the Transportation Center Garage; [3] Relatively minor numbers originate from the Federal Reserve-Financial District to the actual traverse of the Corridor study area,- the bulk of these pedestrians being transit oriented and able to negotiate some prior contact with the system.

"When viewed over the entire afternoon, pedestrian flows in the corridor are heavily oriented in a general east-west direction. Largest volumes occur directly down the spine of the Corridor on Summer Street and range between 15,000 and 20,000 persons. There is relatively little movement in the north-south direction except for the Chauncy-Arch connection." [Murray P. Segal]

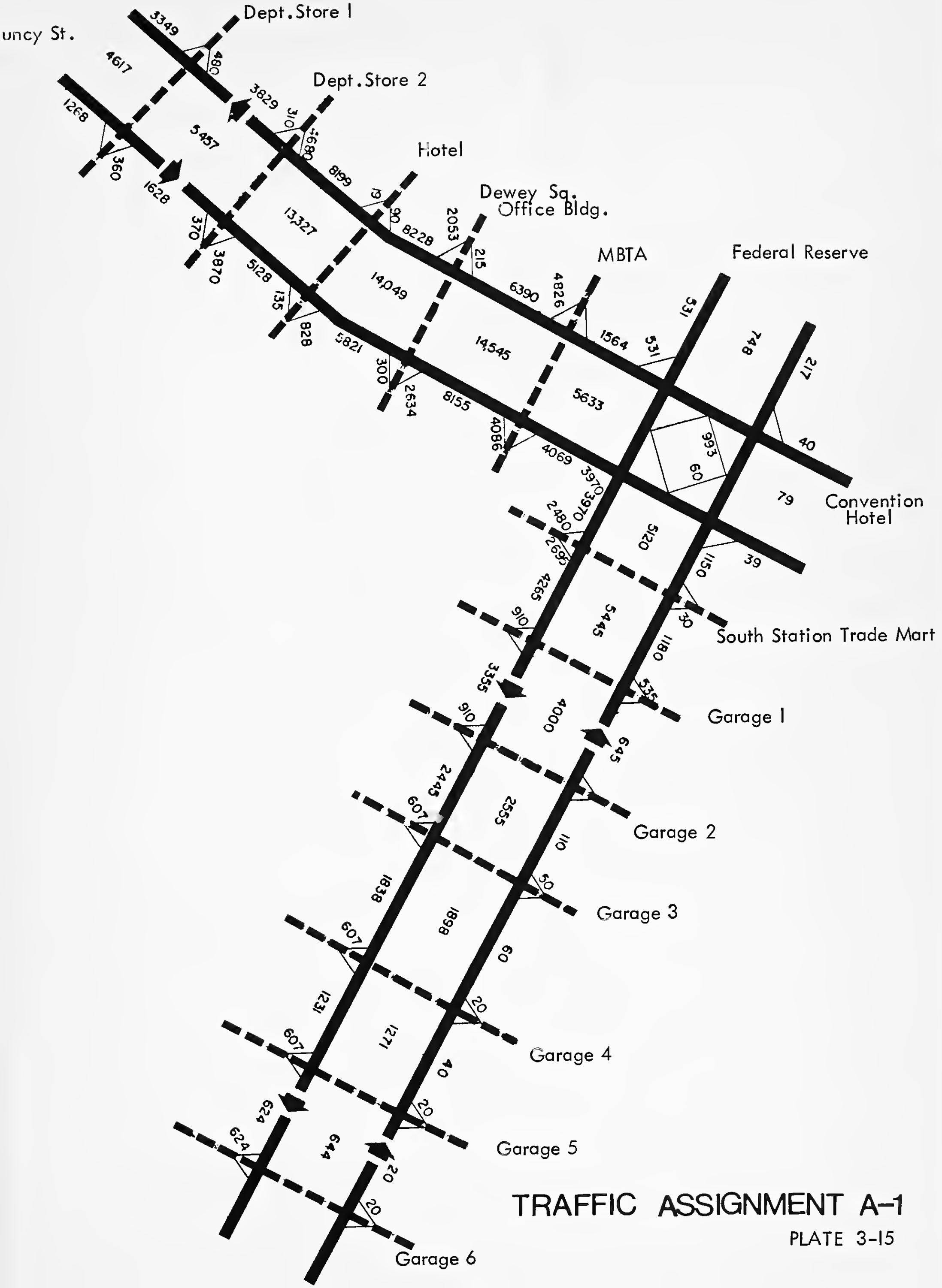
PEDESTRIAN TRAVEL PATTERNS - CBD P.M. PEAK HOUR

PLATE 3-13



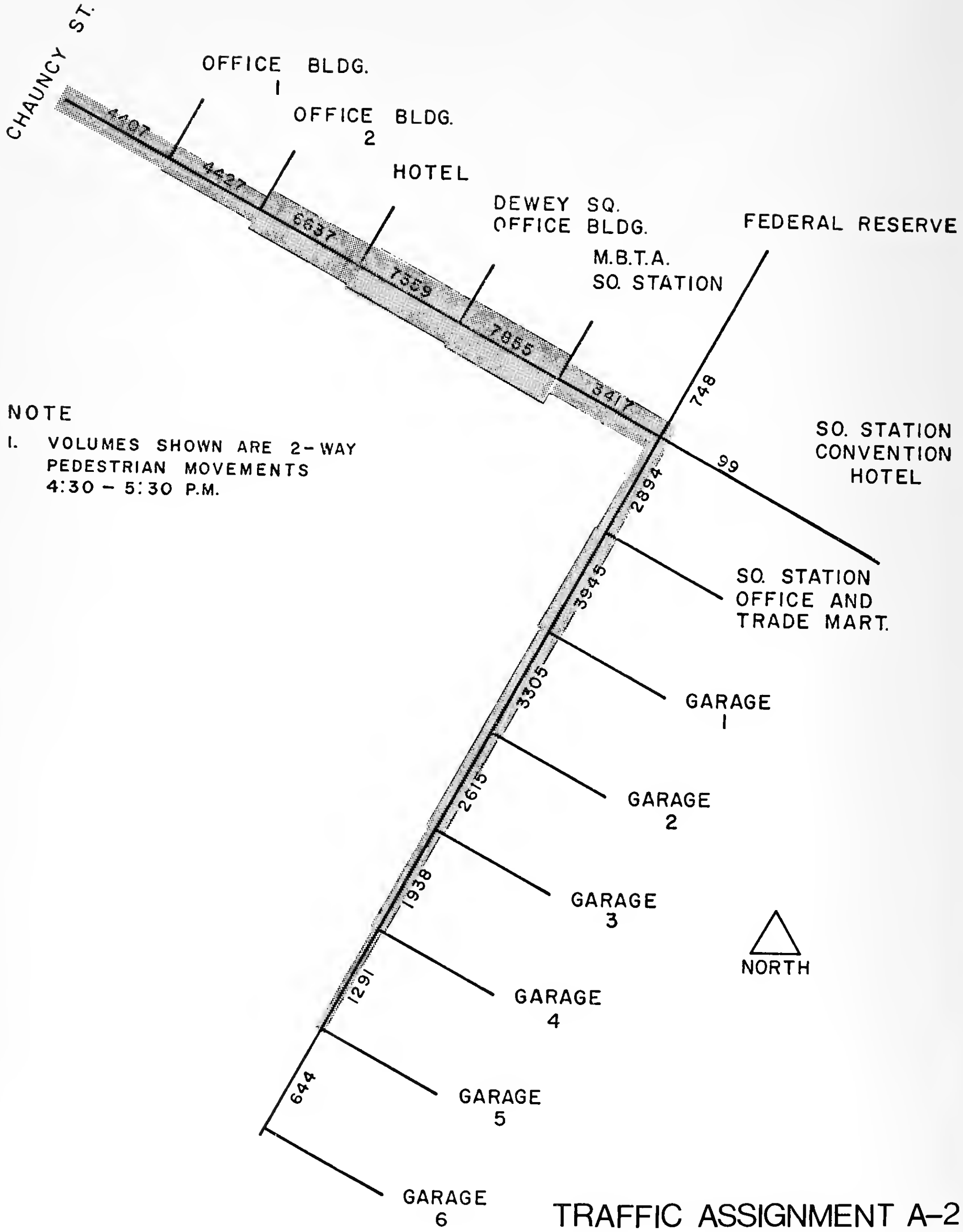
TRAFFIC ASSIGNMENT A-1

PLATE 3-14



TRAFFIC ASSIGNMENT A-1

PLATE 3-15

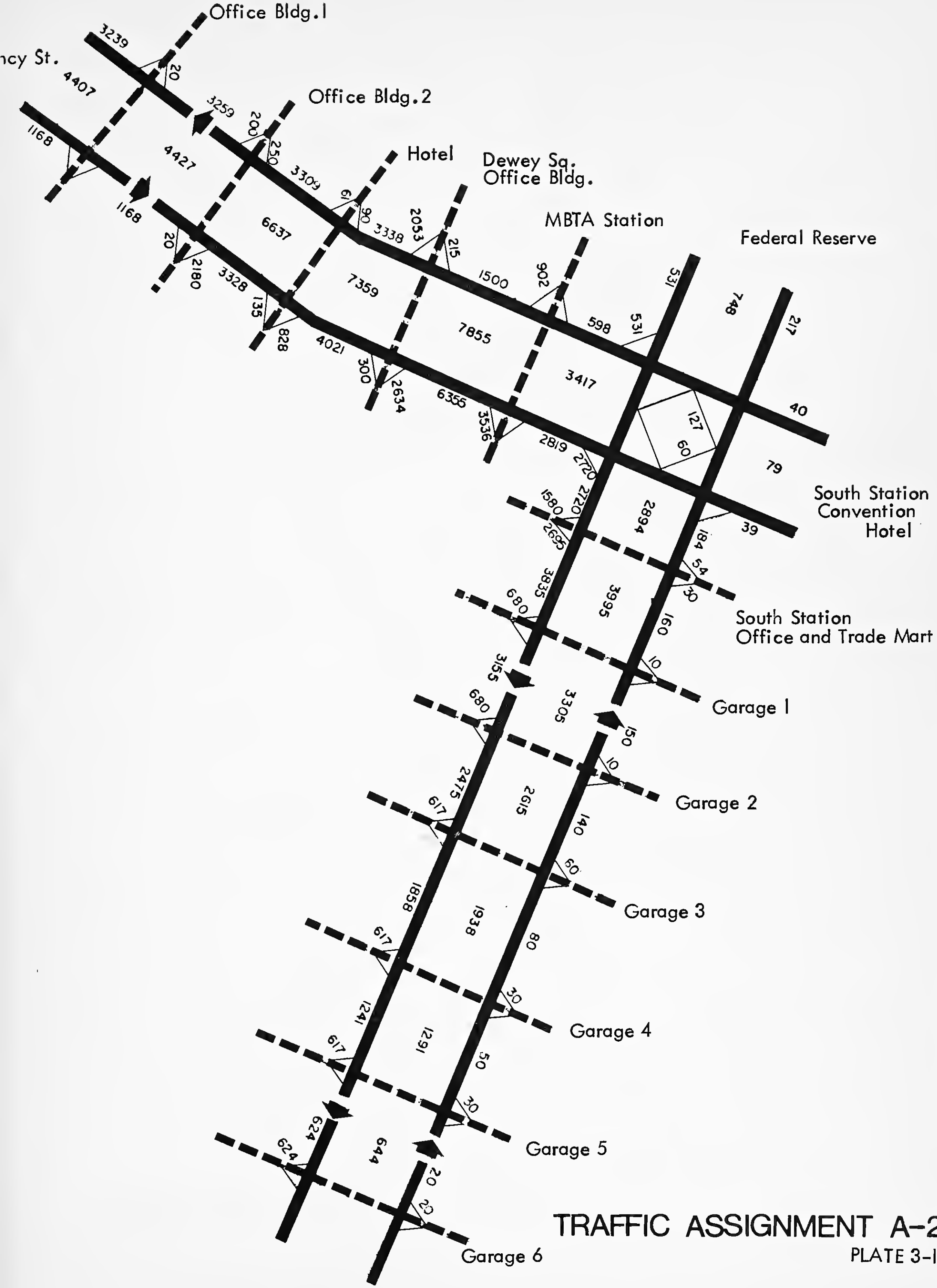


NOTE

1. VOLUMES SHOWN ARE 2-WAY PEDESTRIAN MOVEMENTS 4:30 – 5:30 P.M.

TRAFFIC ASSIGNMENT A-2

PLATE 3-16



TRAFFIC ASSIGNMENT A-2

PLATE 3-17

PUBLIC FRAMEWORK: [See Section 2]

The plates following are extracted from the "Boston/Downtown Study" developing the public framework principle. They are included here to illustrate the relationship of the study area of the proposed pedestrian corridor and the CBD to Downtown Boston distribution as a whole.

In the Public Framework Model opposite, Summer Street is indicated as a primary corridor connecting primary nodes and transit stations between the retail core with the Washington Street North-South axis, and the Channel.

The Model is based primarily upon existing pedestrian paths in the downtown and the existing and projected volume of pedestrians. It reflects population characteristics (distribution and development intensity) and major pedestrian generators, such as transit stations, rail and bus terminals, and large parking garages. It provides a connection between major arrival and destination points. Because of its continuity, the Framework also provides continuous and direct paths thru the downtown and connections between its separate parts in clear and logical sequence.

The Illustrative Public Framework [Plate 3-18 following] is an illustration of applied principles and not a proposal for implementation. It is conceived as a flexible but ordered system that can respond individually to independent development decisions, but always in relation to the organization and performance criteria of the system as a whole.

The plan consists primarily of connections between existing public open spaces and transportation exchanges. The most common connections in the plan, and the most important, are landscaped pedestrian ways that tie all of the parts of the downtown together, providing visual continuity, and establish a high standard of environmental amenity. Consisting basically of special pavement, lighting, information and graphics, street furniture and service elements, the landscaped pedestrian way can be added to with many other components. Arcades, pedestrian transit, connection to vertical circulation, and above and below ground circulation are all essentially supplements or modifications to the basic pedestrian system of landscaped walkways that may be required by especially high volumes of pedestrians or primary connections between major origins and destinations [Summer Street, for example].

The Public Framework Model proposes something that Downtown Boston has never had -- a strong and understandable environmental structure that penetrates all parts of the downtown, responding to diverse demands on it, while providing a greater degree of convenience, safety, direction and environmental amenity.

Development of the Summer Street Study Area is complementary to the Public Framework concept of primary distribution corridor with protected pedestrianway integrated within an overall network.

Study Area Boundary
Primary Corridor
Secondary Corridor
Minor Corridor
Transit Stations and Primary Nodes
Secondary Node
Major Traffic Circulation and Access
Parking Facility
Public Open Space
Public Buildings

CBD

Study Area

PUBLIC FRAMEWORK MODEL

PLATE 3-18

Study Area Boundary	Green Open Space
Existing Sidewalk	Paved Open Space
Landscaped Pedestrianway	Covered Open Space
Protected Pedestrianway	Public Buildings
Below Ground Pedestrianway	
Above Ground Pedestrianway	
Vertical Circulation	
Pedestrian Street Crossing	
Pedestrian Transit	

CBD

Study Area

ILLUSTRATIVE PUBLIC FRAMEWOR

PLATE 3-

SECTION 4 APPROACH (DESIGN STUDY PROCEDURE)

Table of Contents:

CORRIDOR SCOPE AND DESCRIPTION:

Description: An elevated pedestrian way incorporating a moving walk serving commuters, shoppers and noonhour pedestrians within the designated study area, and implementing distribution from traffic generators in that area.

Purpose: "This new system is directed toward relieving the basic network of the overall distribution function and supplementing the pedesrian more in areas where walking is not appropriate or easy". [CADS Report]

STUDY APPROACH: CORRIDOR DESIGN DEVELOPMENT HAS ENTAILED IDENTIFYING AND RESPONDING TO THE SEVERAL SETS OF OBJECTIVES ALREADY DELINEATED OR FOLLOWING, WHETHER ON THE SPECIFIC LEVEL OF CBD DEVELOPMENT, THE CENTRAL AREA DISTRIBUTION SYSTEM, OR IN MEETING THE GENERALLY ACCEPTED STANDARDS FOR URBAN DESIGN AND PLANNING, SPECIFIC DESIGN DEVELOPMENT, USER IDENTIFICATION, BELT TECHNOLOGY, AND TRANSPORTATION PLANNING. IT HAS NEEDED TO DEAL WITH BOTH THE INTANGIBLES OF PLANNING A HUMAN ENVIRONMENT INTEGRATING A MAN-MACHINE INTERFACE, AND AT THE SAME TIME, ACCOMODATE A NUMBER OF PLANNING VARIABLES SUCH AS ALIGNMENT ALTERNATES, SYSTEM ALTERNATES, AND PHASING.

THESE NEEDS ARE NOT NECESSARILY COMPLEMENTARY, AND DEVELOPMENT OF THE CORRIDOR THEREFORE HAS REQUIRED BALANCING AND OFFSETTING OF VERY DIFFERENT NEEDS AND CONSTRAINTS, TANGIBLE OR INTANGIBLE. TO A LARGE DEGREE, THE VARIOUS LEVELS OF NEED HAVE BEEN EXAMINED IN ORDER TO ESTABLISH A FRAMEWORK OF PRIORITIES IN WHICH TO RECONCILE AND SATISFY ALL NEEDS IN AN OPTIMAL MANNER.

THIS HAS MEANT IDENTIFYING AND UNDERSTANDING A 'PROBLEM', THOSE FACTORS INFLUENCING IT, THE IMPACT OF THE CORRIDOR, AND THE VARIABLES OR CONSTANTS INVOLVED, ON THE PREMISE THAT IF THE VARIABLES COULD NOT BE RESOLVED, THEIR IMPACT COULD BE ANTICIPATED OR OPTIMIZED, AND POTENTIALS OR OPTIONS NOT EXCLUDED. CONSEQUENTLY, THE OVERRIDING GUIDELINE IN CORRIDOR DESIGN DEVELOPMENT RECOMMENDATIONS HAS BEEN TO NOT INHIBIT THE CORRIDOR'S POTENTIAL AS A GENERATOR OF THE CITY'S FORM AND FUTURE DEVELOPMENT.

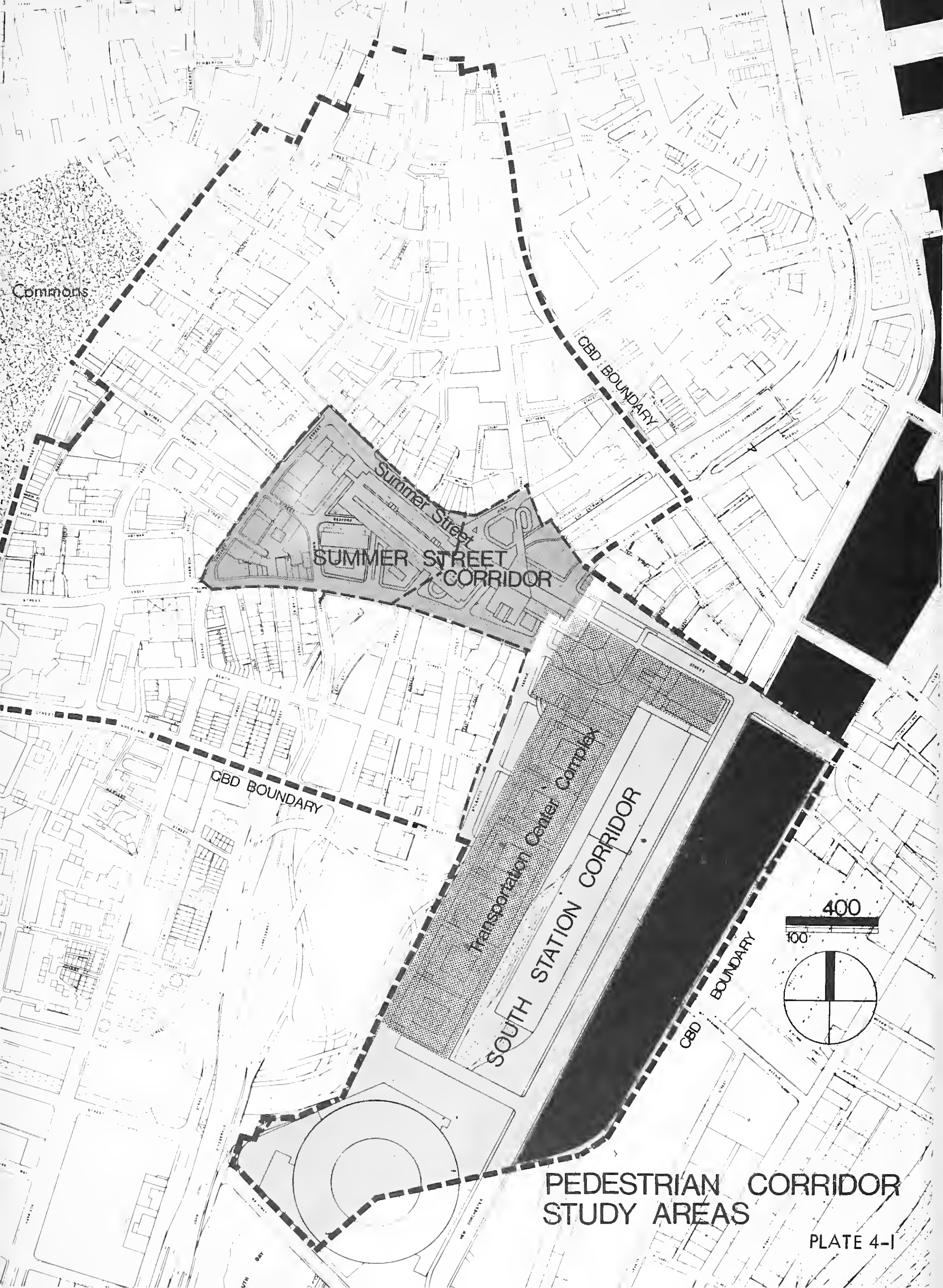
DESIGN APPROACH: BECAUSE OF THE NUMBER OF VARIABLES SUSTAINED DURING THE COURSE OF THE STUDY AND THE NATURE OF THE STUDY ITSELF, THE DESIGN APPROACH HAS BEEN TO IDENTIFY AND OUTLINE A SYSTEM OR FRAMEWORK OF CONSTRAINTS WITHIN WHICH A MOVING WALK SYSTEM WAS FEASIBLE WITHIN THE STUDY AREA. THE APPROACH HAS NOT RESULTED IN AN IMMOVEABLE 'FINAL DESIGN', BUT ATTEMPTS TO DELINEATE A SET OF RELATIONSHIPS WHICH ARE FELT ESSENTIAL TO THE SUCCESS OF THE PROPOSED PEDESTRIAN WAY.

THOSE AREAS IDENTIFIED AS REQUIRING SPECIAL DESIGN CONTROL AND CONSIDERATION HAVE BEEN OUTLINED, AND THOSE WHICH PROPERLY FALL WITHIN THE RESPONSIBILITY OF DEVELOPERS ALONG ITS ROUTE IDENTIFIED. IT IS EXPECTED THAT THE PROPOSAL OUTLINED WILL NEED TO ADAPT TO CONDITIONS ENCOUNTERED WITH THE SPECIFIC BUILDING PROGRAMS OF THE PROPERTIES THRU WHICH THE CORRIDOR PASSES. THESE NEEDS SHOULD BE EXAMINED DURING THE FINAL DESIGN PHASE AND REVIEWED BY THE AUTHORITY. SPECIAL CONSIDERATION MUST NOT BE MADE WITHOUT EXAMINATION OF THE ENTIRE CORRIDOR AND ITS BEST FUNCTIONING IN LIGHT OF BOTH ITS PLANNING CRITERIA AND OBJECTIVES WITHIN THE CBD. FULL COORDINATION THRUOUT THE CORRIDORS FINAL DESIGN AND CONSTRUCTION PHASE IS ESSENTIAL. SUCCESS CAN ONLY BE GUARANTEED BY FULL COOPERATION BETWEEN CITY, DEVELOPERS AND ALL OTHER PARTIES INVOLVED WITH AN UNDERSTANDING OF COMMON GOALS.

CORRIDOR STUDY ELEMENTS: THE STUDY OF THE TOTAL ALIGNMENT OF THE PEDESTRIAN SYSTEM HAS BEEN BROKEN INTO TWO ELEMENTS: [A] THE SUMMER STREET CORRIDOR, AND [B] SOUTH STATION TRANSPORTATION CENTER CORRIDOR, IN DEFERENCE TO THEIR DIFFERENT USES AND PLANNING CONTEXTS. THE SUMMER STREET SEGMENT WILL BE DISTINCTLY PUBLIC AND READILY INTEGRATED WITH SEVERAL NEW DEVELOPMENT PARCELS. THE SOUTH STATION SEGMENT MUST BE CAREFULLY COORDINATED WITH TRANSPORTATION CENTER PLANNING EN-TOTO.

THE BULK OF THE STUDY HAS BEEN DIRECTED TOWARD THE SUMMER STREET CORRIDOR AS THE DESIGN SOLUTION FOR THE TRANSPORTATION CENTER COMPLEX IS UNRESOLVED AT THIS TIME.

PRELIMINARY CONSIDERATIONS OR COMMENTS ON THE SOUTH STATION SEGMENT ARE PRESENTED IN SECTION 6, BUT IT IS RECOMMENDED THAT FURTHER STUDY OF THIS ELEMENT BE DELAYED UNTIL PRELIMINARY PLANNING STUDIES OF THESE DEVELOPMENT PARCELS ARE RESUMED.



PEDESTRIAN CORRIDOR STUDY AREAS

PLATE 4-1

THE DESIGN STUDY APPROACH HAS INCLUDED AS A MAJOR PREMISE THE NEED FOR IDENTIFICATION OF AS MANY OF THE VARIED OBJECTIVES AND LEVELS OF NEED TO BE MET WITHIN THE STUDY AREA BY THE MOVING WALK PROPOSAL, WHETHER DIRECTLY AS A SYSTEM, OR INDIRECTLY AS PART OF THE LARGER DOWNTOWN BOSTON CONTEXT.

A GENERALIZED HIERARCHY OF IMPORTANCE HAS BEEN ASSIGNED THESE NEEDS ON THE BASIS OF GENERAL TO SPECIFIC, IMPACT, AND THE PRIORITY OF HUMAN NEEDS OVER TECHNOLOGICAL, WHILE CONTINUING TO OPTIMIZE ALL NEEDS AS FEASIBLE.

GENERAL PLANNING NEEDS FOLLOW IMMEDIATELY -- MORE SPECIFIC CRITERIA OR OBJECTIVES ARE DEVELOPED AS THEY ARE RELEVANT DURING THE COURSE OF THE STUDY.

CORRIDOR PLANNING AND DEVELOPMENT HAS FOLLOWED THE PLANNING OR URBAN DESIGN OBJECTIVES OR CONSIDERATIONS CITED IN THE FOLLOWING PAGES AND HAS SOUGHT TO COMPLY WITH THIS MAJOR CADS (Central Area Distribution System) CRITERIA: "USEFULNESS IN AND OF ITSELF SHOULD NO FURTHER PROJECTS BE COMMITTED" -- I.E., COMPLETENESS OF THE WORK DURING ITS VARIOUS PHASES OF DEVELOPMENT.

GENERAL PLANNING HAS BEEN DIRECTED TOWARD THESE CENTRAL NEEDS: (I) THE NEED TO SUPPLEMENT THE PRIMARY DELIVERY SYSTEM (TRANSIT AND HIGHWAY) IN ORDER TO PROVIDE FULLY ADEQUATE CENTRAL AREA DISTRIBUTION, AND (2) TO RELIEVE OVERCROWDING OF CENTRAL STREETS WITH VEHICLES FROM THE HIGHWAY ATTEMPTING TO DELIVER TO THE POINT OF FINAL DESTINATION.

CADS (CENTRAL AREA DISTRIBUTION SYSTEM) OBJECTIVES:

Corridor Planning and design development has been directed toward these purposes or objectives:

PURPOSE: THE PURPOSE OF THE CENTRAL AREA DISTRIBUTION SYSTEM WOULD BE TO PROVIDE A SUPPLEMENTARY MEANS OF TRANSPORTATION TO DISTRIBUTE PEOPLE TO AND FROM PUBLIC AND PRIVATE TRANSPORTATION TERMINALS AND TO CIRCULATE PEOPLE WITHIN THE CENTRAL AREA.

CADS OBJECTIVES: THE PRIMARY OBJECTIVE OF THE WALKING (PEDESTRIAN) SYSTEM IS DIRECTED TOWARD RELIEVING THE BASIC NETWORK OF THE OVERALL DISTRIBUTION FUNCTION AND SUPPLEMENT THE PEDESTRIAN MODE IN AREAS WHERE WALKING IS NOT APPROPRIATE OR EASY, AND INCLUDES THESE OBJECTIVES:

Primary Objectives of Supplementary Distribution System (CADS):

[1] Integrate new distribution system with existing transit and automobile systems;
[2] Increase accessibility of more destinations from more origins in the Central area;
[3] Reduce the number of motor vehicles circulating in the Central area;
[4] Maintain and improve pedestrian character of the Central area.

Vehicular-pedestrian:

[1] Reduce excessive travel time from some parking facilities to ultimate destinations;

Transit:

[1] Eliminate or minimize necessity for making two or more transfers to reach some parts of the Central area;
[2] Reduce unpleasant crowding in some stations in the Central area;

3] Provide better service to some portions ›f the Central area from existing transit lines ınd stations;
4] Provide alternatives to long waiting time, ›articularly in off peak periods, and circuitous ıccess between underground facilities which s too time-consuming and out of scale for hort-term inner core trips.

'edestrian Objectives:
1] Minimize unreasonably long walking listances from transit stations and parking ıreas to major destinations in CBD;
2] Relieve confusion and lack of clarity of existing pedestrian routes within the retail ore and financial district;
3] Implement traffic flow by removing ped- strian conflict;
4] Create pleasant physical environment or pedestrian in CBD.

CBD PLANNING OBJECTIVES (Excerpts - CBD Report):

SUMMER STREET (CHURCH GREEN):

[1] Combine the need for new streets and other public improvements with the need for comparative shopping facilities, office space, parking and pedestrian areas;
[2] Establish a system of parking and commercial structures with interconnecting access ramps, bridges and pedestrian walks so that parcels may be developed individually, yet where combined will form a continuous structure and pedestrian route;
[3] Retain a high degree of flexibility in land use and building controls to permit a wide range of development solutions;
[4] Encourage multi-parcel development with concurrent construction phasing, thereby achieving architectural unity and a continuity of public improvements;
[5] Reserve space within buildings or a special area for convenience service to shoppers such as meeting rooms, rest spaces, credit establishments, amusement facilities, nursery and child care, delivery service, package storage, automobile service, pickup, etc.

URBAN DESIGN OBJECTIVES: THE CORRIDOR, IF ESTABLISHED AS A MAJOR PEDESTRIAN AND TRANSPORTATION MEDIUM, WILL BE SUCH A STRONG AND INTEGRAL PART OF THE FABRIC OF THE CBD, THAT ITS DEVELOPMENT SHOULD RECOGNIZE AND TAKE INTO CONSIDERATION THESE GENERAL PLANNING OBJECTIVES:

Transport: A time-appropriate and convenient pedestrian movement route obviously improving user mobility in the desired direction, and incorporating such accessibility as to minimize cost and effort to communicate between activity locations. It should contribute to the 'efficiency' of the city system itself, balancing and limiting exertion relative to cost.

Flexibility: Accept change and extension with minimum disruption to the user and City, encouraging flexibility of use along its route, and accept change of land use and replacement of existing buildings.

Resilience: Absorb stress and avoid breakdown, recovering rapidly to its proper function.

Safety: Incorporate a movement system that is 'safe' within an environment that is 'safe.'

Comfort: Establish a level of convenience and comfort environmentally and functionally for the user, and should be significantly more interesting and attractive than the street level.

Symbolic: Achieve an urban image which is in itself conducive to its use, -- i.e., interest, appropriateness, attraction, specific environmental character and sense of 'place'.

Sense of Community: Be realized as a 'system for all people', -- a part of the urban fabric, contributing to and serving as a link between adjacent sub-areas.

Economic Impact: Enhance property values and frontage viability, providing an increased and optimum frontage through the development of the multi-level potential of the Corridor and its function, and its integration with the transit as a means of attracting users.

Costs: Costs of the installation and operation to the City must be more than offset by overall development realized.

Visual - Environmental: Realize a form which is visibly differentiated, clearly structured (orderly), and producing a strong, simple, continuous visual image and being identified as a place which is environmentally attractive.

Urban Space: Enclosed space(s) with a floor suiting its purpose (pedestrian walking mode, movement system, and scale) and readily distinct purpose. Open space should be accentuated and clearly defined against urban form.

Maintenance: Equipment and environment should be simple, easy to maintain, not collect debris, etc.

Accessibility: Easily located and entered from primary locations/destinations.

URBAN DESIGN CONSIDERATIONS:

URBAN DESIGN CONSIDERATIONS ARE VERY SPECIFICALLY LINKED WITH CBD OVERALL PLANNING OBJECTIVES OF A VERY PHYSICAL NATURE HAVING SPECIFIC IMPACT. SUCH PLANNING OBJECTIVES NEED TO BE DELINEATED BY THE CITY AS INTENTIONS FOR DEVELOPMENT OF THE AREA. DESIGN AND PLANNING HAS PROCEEDED ON THE BASIS OF ATTEMPTING TO IDENTIFY OR DESIGNATE THE DIFFERENT IMPLICATIONS OF SPECIFIC ALTERNATES RELATIVE TO URBAN DESIGN POSSIBILITIES. THE FOLLOWING ARE POSSIBLE EFFECTS OR IMPLICATIONS OF PEDESTRIAN CORRIDOR:

SUB-AREAS: CBD: The Corridor can act to clarify and define boundaries of the various CBD sub-areas, -delineating general districts, yet serving as a spine servicing all sub-areas; or, it can become in itself a new 'centre around which sub-areas are clustered and merged. [Planning has assumed the former: that the corridor is only incidentally an arrival point, in serving existing sub-areas whose identity may be individually reinforced. A certain degree of the latter will take place inevitably, but should be evidenced in Summer Street character as a whole. An interior corridor might more distinctly become a new 'centre', with possibly less particular influence on the future form of Summer Street.]

FORM AND DEVELOPMENT: The Corridor will create new development potential and a new major axis in the CBD [this axis is already implied by present travel patterns, vehicular needs and physical relationships], which will be one of several such natural axes, -e.g. Stuart Kneeland, Congress and the South Market-State Street laterals, all leading to the major North-South axis between Government Center and the South Cove, -the proposed Washington Mall, Chauncy-Arch and Tremont.

PEDESTRIAN NETWORK: The Corridor has long range potential for extension as part of a 2nd level pedestrian network in the CBD. Chauncy-Arch Street is an example, where proposed widening and realignment would permit linking Government Center and the South Cove and complementing its increased prominence as a major corridor, increasing accessibility through the time-distance improvement afforded by separation of pedestrian from vehicle.

FORT POINT CHANNEL: Improved accessibility suggests development of the channel and the East bank.

SPECIFIC PLANNING OBJECTIVES:

FLEXIBILITY:
Corridor flexibility: The pedestrian system, as a permanent and form-giving element of the city fabric, nevertheless over a period of time should be capable of responding to new demands and needs as they become apparent, especially since the area in which the corridor is provided is undergoing considerable change and the extent and nature of this change, with the addition of the Corridor itself cannot be gauged in exactitude. It is recommended that the corridor be capable of extension at a number of points along its way so as to permit response to changing needs. The main corridor itself might be regarded as reasonably fixed with the exception of capacity flexibility via movement system or capability to receive a system accommodating greater volumes in the long range future as the need arises.

Access-egress points to the corridor, if at all possible, should be planned in such a way that should some major need or detriment be identified, these points can be relocated or added without particular effort.

Construction Phasing Flexibility: The construction and implementation characteristics dictate phasing capability both physically and mechanically, as funding and parcel development permit, cooperating with different parcels along its route.

Ability to accommodate Technological Change: Develop capability for receiving advanced modes of transport to the best of our knowledge should such modes become available.

DEVELOPMENT PARCELS:
Parcel development area: Establish corridor alignment and development so as to optimize buildable development area with the urban density of the CBD.

GENERAL:

Design for pedestrians involves both human physical and psychological factors. Acceptable densities of pedestrian flow are relative to the context and purpose of the facility. The proximity acceptable and desirable in one place is different than that in another and is governed by custom, culture, and circumstance. Effectiveness of activities and areas is relative to density, flow tempo, and degree of interaction desired. Varied interaction effects can be achieved thru controlled flow.

Uniform standards for pedestrian signs or traffic design have not been established, aside from the system proposed in John J. Fruin's dissertation "Designing for Pedestrians -- A Level of Service Concept", Polytechnic Institute of Brooklyn, Jan., 1970, which attempts to provide a system of pedestrian design standards emphasizing qualitative as well as quantitative factors. This dissertation identifies the variability and maneuverability of pedestrians as the key problem in determining capacity and proposes a range of densities based on ease of movement similar to the Level of Service Standards developed by Traffic Engineers for vehicular flow in highway design.

The proposed pedestrian Corridor has been examined against these standards for capacity.

Criteria for good design for the movement system user are different from those for the walking pedestrian experience. The system user's attention is focused on stability, orientation, and points of decision rather than upon a companion, adjacent frontage, or the context. In addition, he faces specific visual or vestibular perceptual problems. Some of these are suggested in the sections that follow. At best, our understanding of these new needs and the differences between the 2 pedestrian types (foot or belt is limited by the state of the art).

Danger and uncertainty arises in the walking mode when densities become great, reducing reaction time to stimuli, increasing psychological stress levels. The user of the moving walk, in addition to requiring increased stimuli reaction time, must deal with added stability factors and the potential of new decisions, collision due to perceptual misinterpretation on his or another's part or to 'stopping' slowing, acceleration of a system.

Standing and Walking:

Walking: Human locomotion requires constant shifts in the body's center of gravity, adjustments in applications of force caused by differences in terrain, ground friction and ground slope, and adjustments in speed by alteration of pace length and timing to avoid obstacles ahead or to the side.

"The pacing sequence of the walking cycle has been found to be a deeply engraved neurological pattern which is relatively fixed through the greater part of the human life span. Experiments based on electrical measurement of the time spacing between foot contacts and contact duration in the normal human walking pace indicate remarkable consistency of gait timing between all ages and sexes. Despite all these factors, walking is one of man's most efficient activities requiring relatively small expenditures of energy. Bekker, The Theory of Land Locomotion, states that human biped walking is the most efficient means of animal locomotion, almost ideally approaching the concept of the wheel in its rotary application of force. (12) Stair locomotion is quite different. Total energy expended is 10 to 15 times greater ascending, and about 1/3 greater descending, than walking an equivalent horizontal distance to the heighth of the stair.

Human Reaction and Sensory Factors:

"For reasons of, (l) personal safety, (2) the social convention of avoiding brushing against or bumping into others, or (3) just the desire for sightseeing, the pedestrian must be prepared to react to a whole range of sensory stimuli at any instant. Sensory input can come from one or any combination of sources: Hearing, to alert him to such sounds as a warning automobile horn; Touch, to signal slippery or irregular terrain; and Sight, to evaluate a myriad of things varying from the movement of pedestrians and vehicles to the interpretation of stationary signs and traffic signals. The lack of any one of these sensory inputs, or a failure to react to them, can subject the pedestrian to anything from embarrassment to serious injury. Studies of human reaction times indicate that the time elapsing between visual stimulation and a subsequent foot reaction for automobile braking requires four to five tenths of a second depending on the age of the subject. Because of the human time lag between sensory stimulation and reaction, it is necessary for the pedestrian to project a zone of sensory awareness ahead of him in order to be prepared for evasive action at any instant.

The capabilities of human vision have a significant effect on pedestrian activity. Gibson, the perception of the visual world, uses the term "locomotion vision" to describe a whole series of specialized visual characteristics connected with the problems of judging velocity, distance and direction of others during walking. Observations of pedestrians with poor sight confirm the importance of vision. These pedestrians walk slower, negotiate stairs more cautiously, or even stop momentarily at a stair or motorstair to "get their bearings". Even normally sighted persons are limited by the capabilities of the human eye which detects detail accurately within a conical range of only 12 degrees and with greatest visual acuity at the very small range of 3 or 5 degrees. Beyond this range, there are general sight capabilities which are less able to detect detail. In one aspect of general sight capability involving the range encompassed by a level horizontal gaze, it would be necessary to be at least 7 feet away from a person to observe him from head to toe. Pedestrians would be likely to adapt such a spacing to judge the speed of a person in front and to avoid stepping on his heels.

Convenience:

Convenience of a path system depends on four factors:

[1] The walking distances, directness and identification of routes;

[2] The connections with public transport and the efficiency of this;

[3] Pleasantness of the route, making it an end in itself;

[4] Protection from weather, making it seem shorter.

SECTION 5A

SUMMER STREET CORRIDOR
GENERAL PLANNING DEVELOPMENT

Table of Contents

SUMMER STREET CORRIDOR STUDY AREA: THE SUMMER STREET CORRIDOR STUDY AREA IS CENTRAL RELATIVE TO THE CENTRAL BUSINESS DISTRICT, ACTING AS A SEAM BETWEEN THE SEVERAL SUB-AREAS: FINANCIAL DISTRICT, LEATHER DISTRICT, RETAIL CORE, ETC. AS DELINEATED EARLIER, THIS STUDY AREA WILL BE AVAILABLE DUE TO URBAN RENEWAL FOR DEVELOPMENT AND RECEPTIVE AS A CORRIDOR SITE, AND ESTABLISHES A POTENTIAL DIRECT CONNECTION BETWEEN THE TRANSPORTATION CENTER AND THE RETAIL CORE [SEE PLATE 5A-I].

SUMMER STREET: SUMMER STREET DUE TO ITS PHYSICAL CHARACTERISTICS AND CENTRAL POSITION RELATIVE TO THE RETAIL CORE, TRANSIT GENERATORS AND ABUTTING DISTRICT, NATURALLY COLLECTS A CONSIDERABLE DIVERSITY AND VOLUME OF PEDESTRIAN USER TYPES AND VEHICLES DURING THE COURSE OF THE DAY. CHANGES IN TRAFFIC PATTERN AND STREET DIRECTION, IN ADDITION TO BOTH THE STRONG INPUT OF VEHICLES COLLECTED TO OR FROM THE CENTRAL ARTERY CONNECTIONS AND ITS ACCESS CAPABILITIES ACROSS THE CHANNEL REINFORCE IT AS A MAJOR CIRCULATION CORRIDOR FOR PEDESTRIAN AND VEHICULAR MODES. NEW CONSTRUCTION, COUPLED WITH THE CONCENTRATION OF TRAFFIC GENERATORS AT THE NEW TRANSPORTATION CENTER, LEND IMPETUS TO ITS INCREASING ROLE AS A MAJOR CBD DISTRIBUTION CORRIDOR.

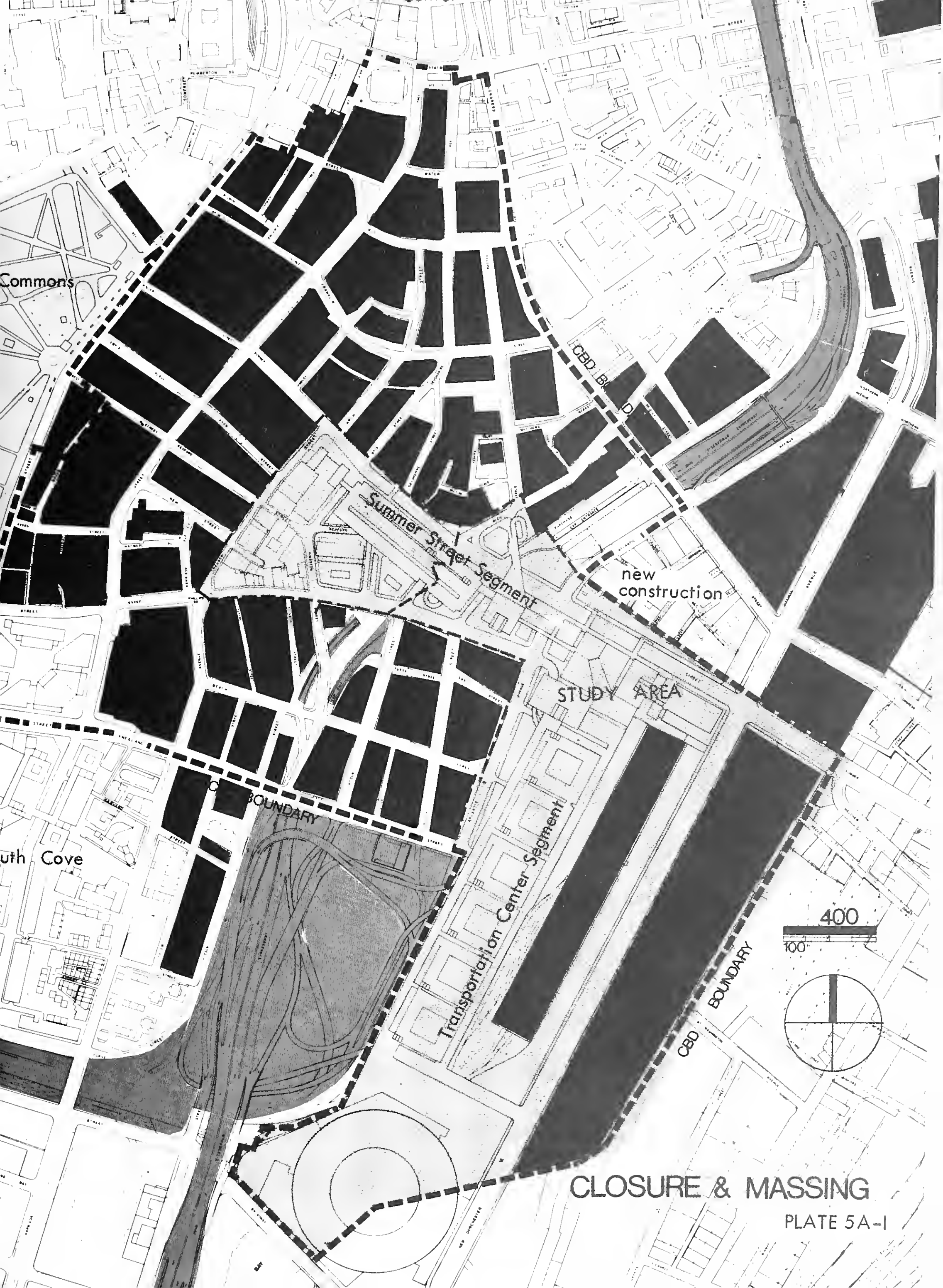
BOSTON'S EVOLVING FORM WILL BE A PRODUCT OF ITS PHYSICAL CONSTRAINTS, SUB-AREA CONCEPT AND ITS TRANSPORTATION NETWORK. THE CITY'S INTENTIONS WILL GREATLY INFLUENCE THE CLARITY OF THIS FORM.

THE PEDESTRIAN CORRIDOR: A large part of the difficulty in our cities rises from our neglect of the pedestrian. Walking will always be a prime mode of transportation. The urban problem is created when cars interrupt the flow of pedestrians, and is not inherently derived from the cars and pedestrians. An ideal answer of course is separation. The pedestrian within the study area notoriously exerts his right-of-way, crossing at will across heavy traffic, at his own risk, and with disruption to vehicular flow. The existing poor street layout at Dewey Square resulting from the Expressway route affords no alternate. Consolidation and realignment of surface streets in this area as proposed will alleviate pedestrian - vehicular conflict in this area. Provision of a major thru pedestrian Corridor at 2nd level alongside the moving walk system will both relieve surface congestion aggravated by pedestrian - vehicle conflict, and create a new and viable commercial frontage with an assured accessibility and exposure. The proposal developed in the body of this report puts considerable emphasis upon respecting the development potential of such a 2nd level pedestrian Corridor, while optimizing its distribution function. The 2nd level inherently solves the problems of pedestrians waiting at intersections, separation of pedestrian and vehicle, while at the same time improving both pedestrian and vehicle travel time-distance capacities.

CLOSURE CONCEPT: As has already been noted, the Summer Street segment context will consist of almost entirely new construction. This lends special concern for the potential of the proposed Corridor as a link and element of continuity within the overall downtown framework. The site has no special vistas, landmarks or buildings of note presently. At the west, Summer Street terminates in the proposed Mall with a closed vista; to the east, it will escape into the open space of the Channel, pending future development of the east side. A general low building mass closes the street, with a skyline of major new towers developing in the Financial District to the north.
Tra

Traditional building patterns in Boston have held the sidewalk line, establishing strong urban closure of streets. Winding and radial streets generate limited vistas. The only open vistas from the study area are those created by the Expressway route and the bridge at the end of Summer Street crossing the Channel. The pedestrian is quite often confronted with several choices of direction at the terminus or divergence of a typical street (Plates 3-2 and 3-4). This characteristic lends special character, charm and identity to the City. It is strongly urged that construction within the study area conform to this traditional pattern of street closure, and massing, an that the open Expressway vista be closed with th massing permitted by its structural platform. The open vista to the Channel is complementary wit the importance of Summer Street as a major pedestrian and vehicular Corridor within the CBI connecting with the East side of the Channel.

For reasons of closure, the additional square footage of development area afforded vertically and the natural environmental protection and structural support provided by building context, the 2nd level way containing the moving walk system has been located within new building envelopes along its route. This has permitted the pedestrian Corridor to become tightly integrated within its context without dominating or interrupting the urban fabric, at a minimum of cost to the City.



CLOSURE & MASSING

PLATE 5A-1

URBAN DESIGN: The position of the corridor within the study area was largely determined by its potential for impact within the CBD.

Boston's evolving form will be a product of its physical constraints, sub-area concept and its transportation network. The city's intentions for growth and development of the CBD will greatly influence the clarity of this form.

The development of a pedestrian system will give great impetus to adjacent and related properties. It has been of prime importance, therefore, that the alignment and development of the system not be based upon visual aspects, user, microclimatic data, or movement system constraints alone, but take into consideration that economics and growth patterns are of great importance as the proposal deals with the transportation fabric of the city and this with one of the very basic tools of urban planning. The study has adopted as a major objective that the proposed pedestrian corridor optimize rather than limit the options available to the city for immediate and long-range growth and development within the CBD, providing maximum opportunities to regenerate rather than inhibit its future development.

USER: It has been the intent of this report to identify the persons using the system in a more finite way than traffic volume studies entailed in order to better identify the actual user and the corridor's emphasis, impact, and service capabilities.

Several routing alternates, the integration of different movement system types, the effects and urban design implications of the corridor alternatives on the growth and development of the CBD were examined in an effort to determine proper scale, design, and positioning of the pedestrian corridor.

ALIGNMENT: Basic corridor position is dictated by 2 primary desire points for traffic generators at either end of the study segment: (1) the transportation center, (2) the Washington Street transit station in the retail core, and (3) study area boundaries.

Several corridor alignment alternates were developed in response to these desire points, and their ability to receive a movement system and their impact upon the CBD examined.

An Essex Street position was not developed, because it did not satisfy immediate connection requirements to the transit generator at Washington Street nor serve the heart of the retail core toward which considerable pedestrian traffic is directed. An interior proposal was discarded because of the constraints which it placed upon developers of parcel through which it would pass, and construction feasibility limitations.

The Summer Street edge most directly responded to traffic generators at either end of the study area, to the financial district, retail core destinations, and presented potential for acting as a stimulus to development north of Summer Street, the financial district and the channel depending upon choice of alternate connection to the transportation center.

Plate 5-2 (opposite) illustrates the 2 basic corridor alignment alternates ("Alternate 1--Straight Alignment" and "Alternate 2--Jogged Alignment") which were developed most extensively. They differ in point of connection to the transportation center. When examination established that Alternate 2 did not meet all criteria, a modification -- "Alternate 2B-Forked Alignment" (see Appendix) -- entering the transportation center from Essex Street and providing an additional route on the north side of Summer Street, was explored, and discarded as not permissive of movement system continuity. Alignment Alternate 1 is developed in the body of this report.

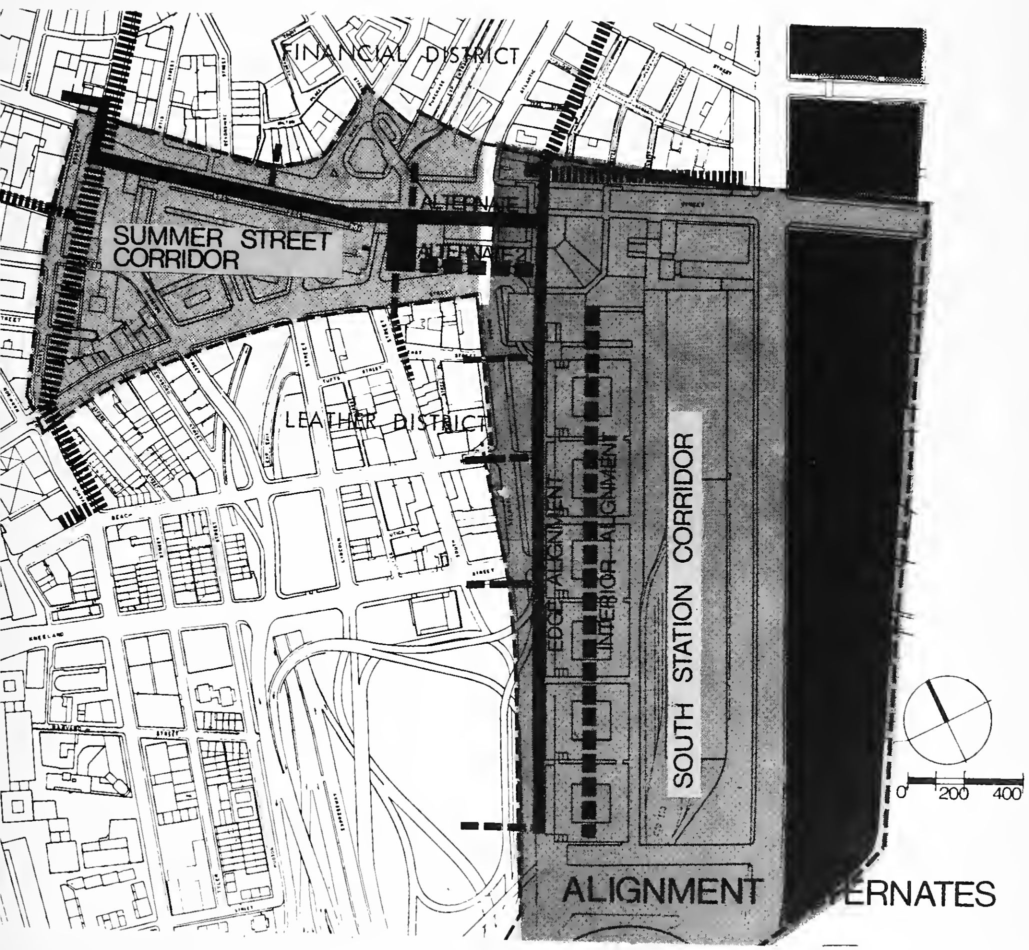
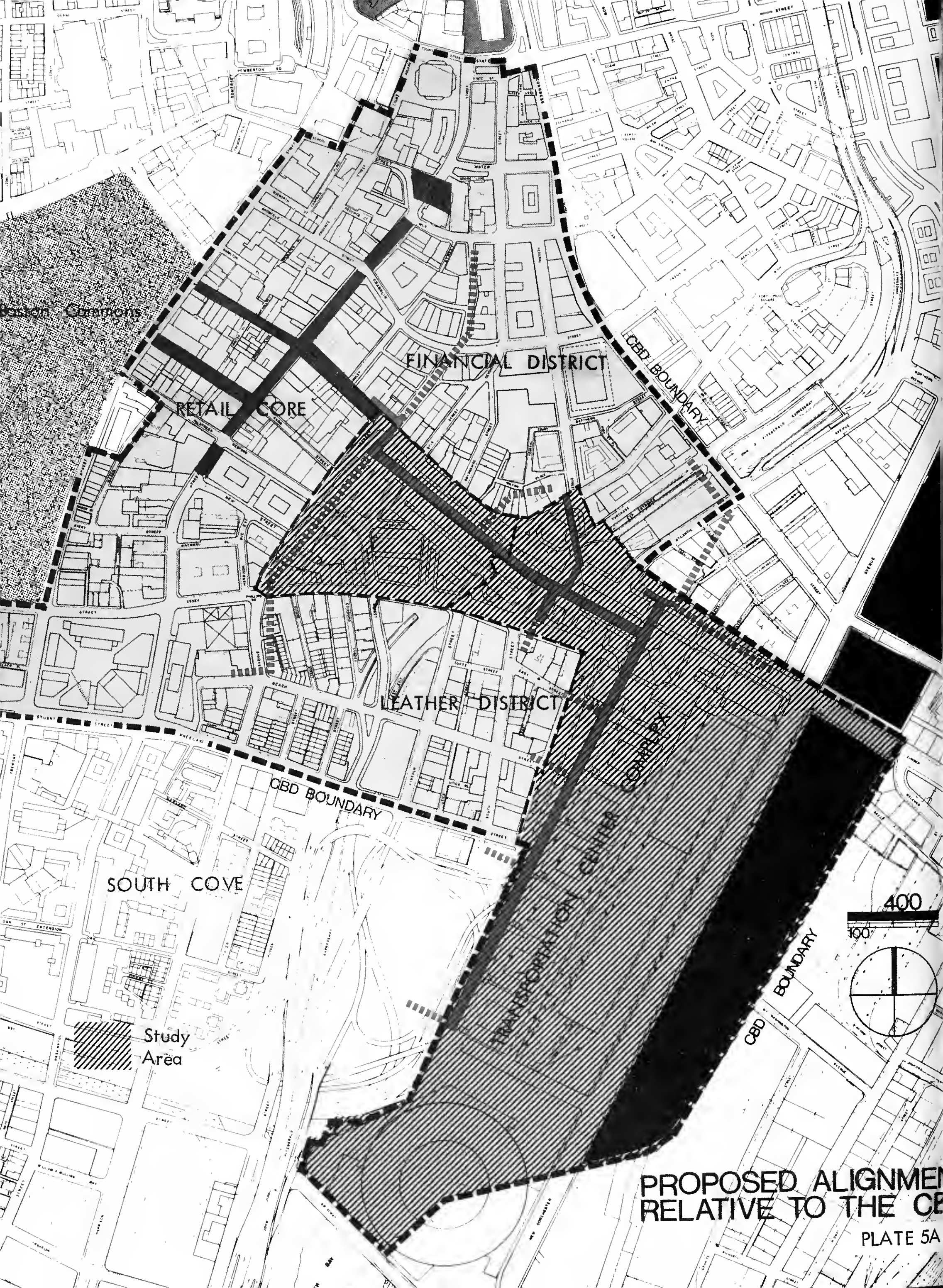
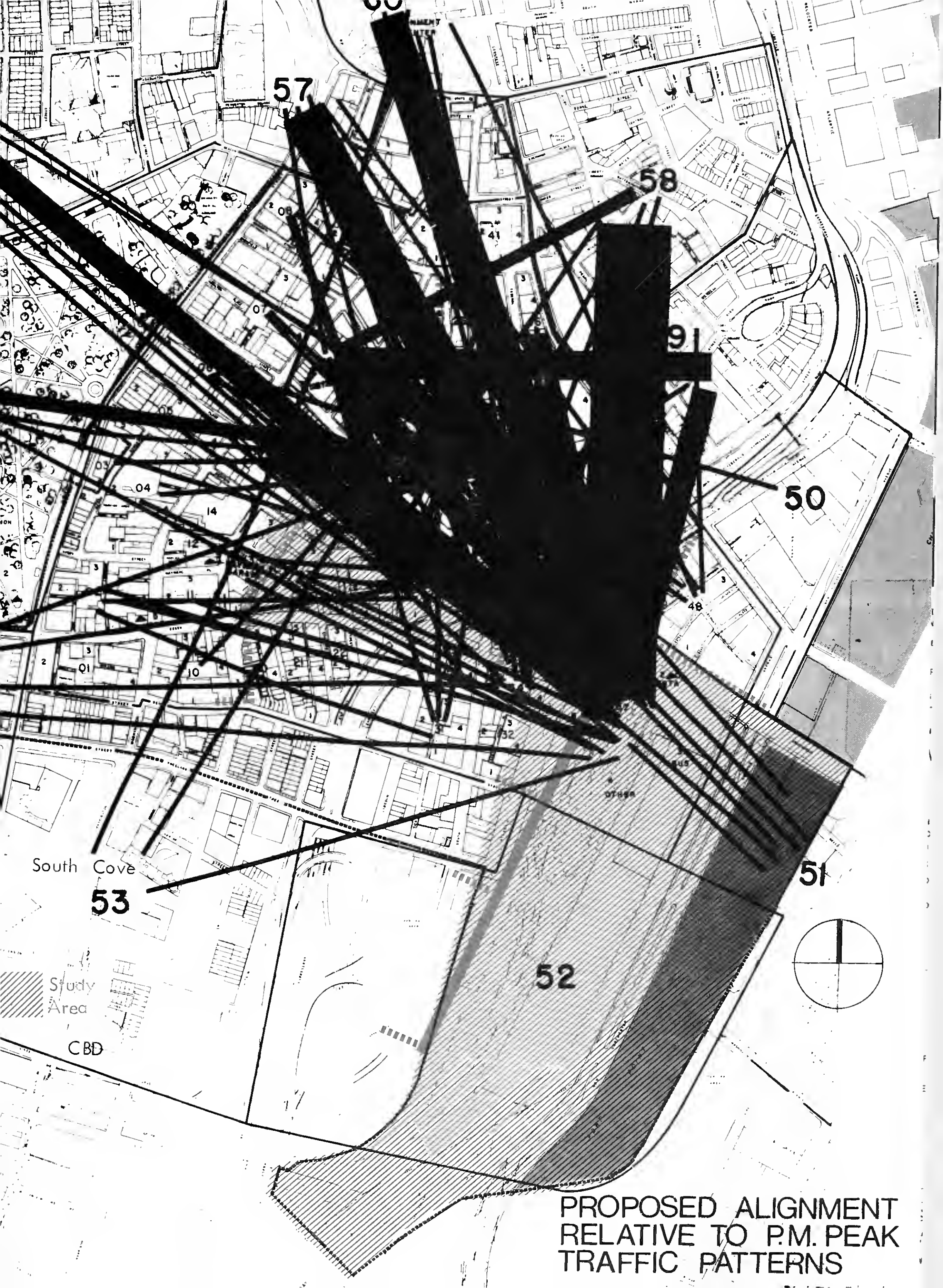

FINANCIAL DISTRICT
ALTERNATE
ALTERNATE 2
SUMMER STREET
CORRIDOR
LEATHER DISTRICT
EDGE ALIGNMENT
INTERIOR ALIGNMENT
SOUTH STATION CORRIDOR
0
200
400
ALIGNMENT
ERNATES

PLATE 5A-2


Boston Commons
FINANCIAL DISTRICT
RETAIL CORE
CBD BOUNDARY
LEATHER DISTRICT
CBD BOUNDARY
SOUTH COVE
TRANSPORTATION CENTER COMPLEX
CBD BOUNDARY
Study Area
400
100
PROPOSED ALIGNMEN
RELATIVE TO THE CB
PLATE 5A


57
58
91
50
51
52
53
South Cove
Study Area
CBD
PROPOSED ALIGNMENT RELATIVE TO P.M. PEAK TRAFFIC PATTERNS

THE PEDESTRIAN CORRIDOR AS AN ELEVATED PEDESTRIAN WAY INCORPORATING A MOVING WALK SYSTEM, WILL SERVE BOTH A VARIETY OF USER TYPES, COMMUTERS, SHOPPERS, LOCAL TRAFFIC, AND NOON-HOUR PEDESTRIANS, - AND THE RANGE OF AGES AND PHYSICAL CAPABILITIES EXPECTED OF THE GENERAL PUBLIC. ITS PURPOSE IS ESSENTIALLY TO " RELIEVE THE (TRANSIT) NETWORK OF THE OVERALL DISTRIBUTION FUNCTION AND SUPPLEMENT THE PEDESTRIAN MODE IN AREAS WHERE WALKING IS NOT APPROPRIATE OR EASY (CADS)."

PEDESTRIAN FLOW STUDIES: A series of generalized pedestrian flow studies were made of different user types within the CBD to determine actual routes which pedestrians might take for certain purposes on the basis of the 'shortest distance.' The purpose was to determine graphically the probable 'user' of the proposed corridor, and the probable field of influence of the corridor upon normal pedestrian flow. The studies were intended to supplement statistical traffic research -- volume was not a consideration.

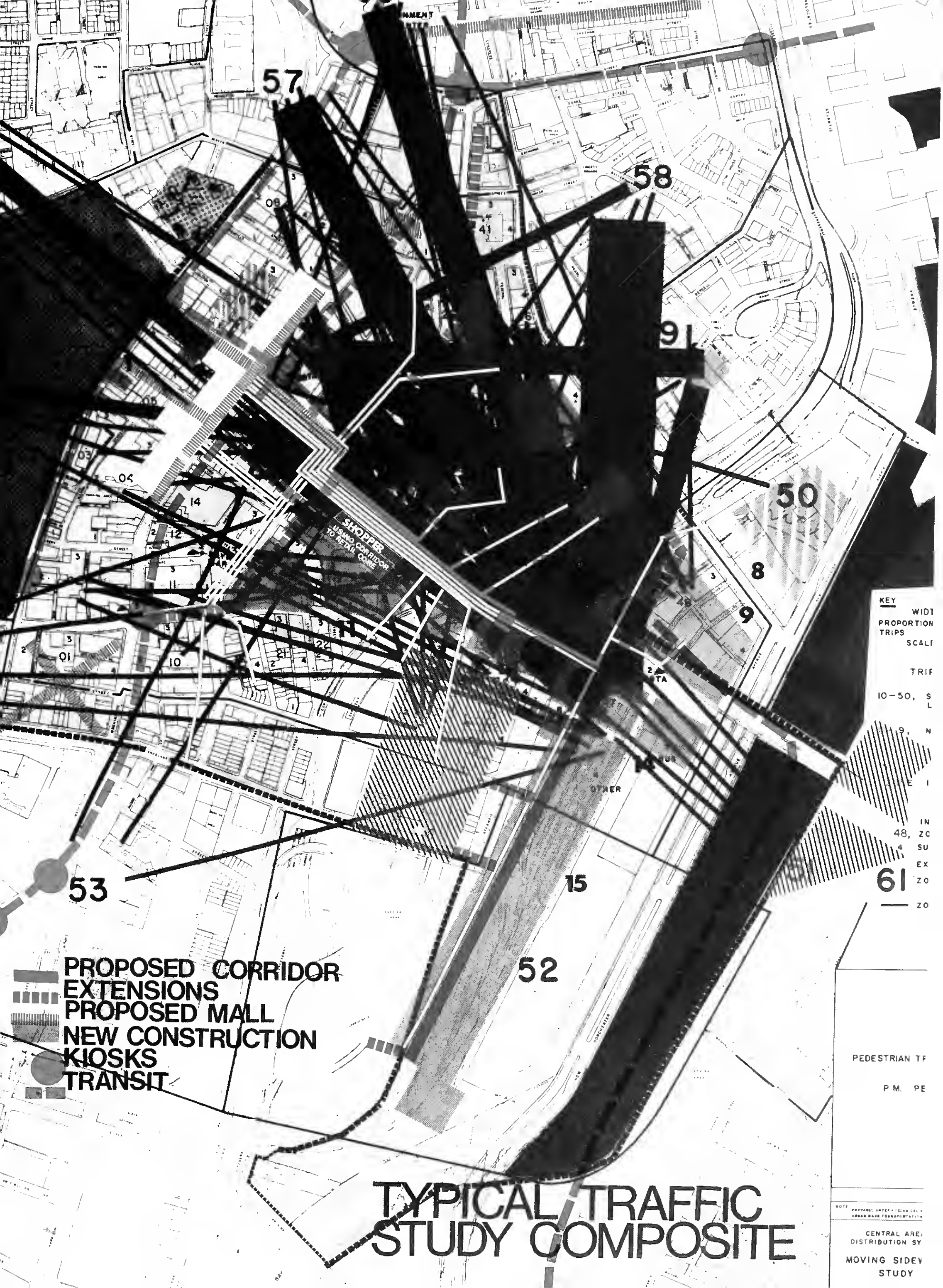
USER TYPES: Three major user groups are identified: the commuter, shopper, and noon-hour pedestrian. The noon-hour user, since his patterns could not be determined on a major origin-destination basis, has been generalized with that of the shopper. The CBD is undergoing too extensive change to permit any generalization about noon-hour traffic other than that a percentage will attempt to reach the retail core, and others will most certainly be attracted by the corridor itself depending upon its frontage development.

Commuter: The corridor serves only those commuters who (l) already would be likely to be traversing Summer Street (responding to existing pedestrian patterns); (2) those generated by the new garage and transportation facilities, and are destined for the retail core or Beacon Hill, and for a short distance by way of coincidence or choice those destined from the transportation center to the middle financial district (these users have the option of crossing directly to the north at the Federal Reserve Bridge from the center); and (3) those commuters from the green or orange lines exiting at Washington Station and destined for a corridor location or the transportation center.

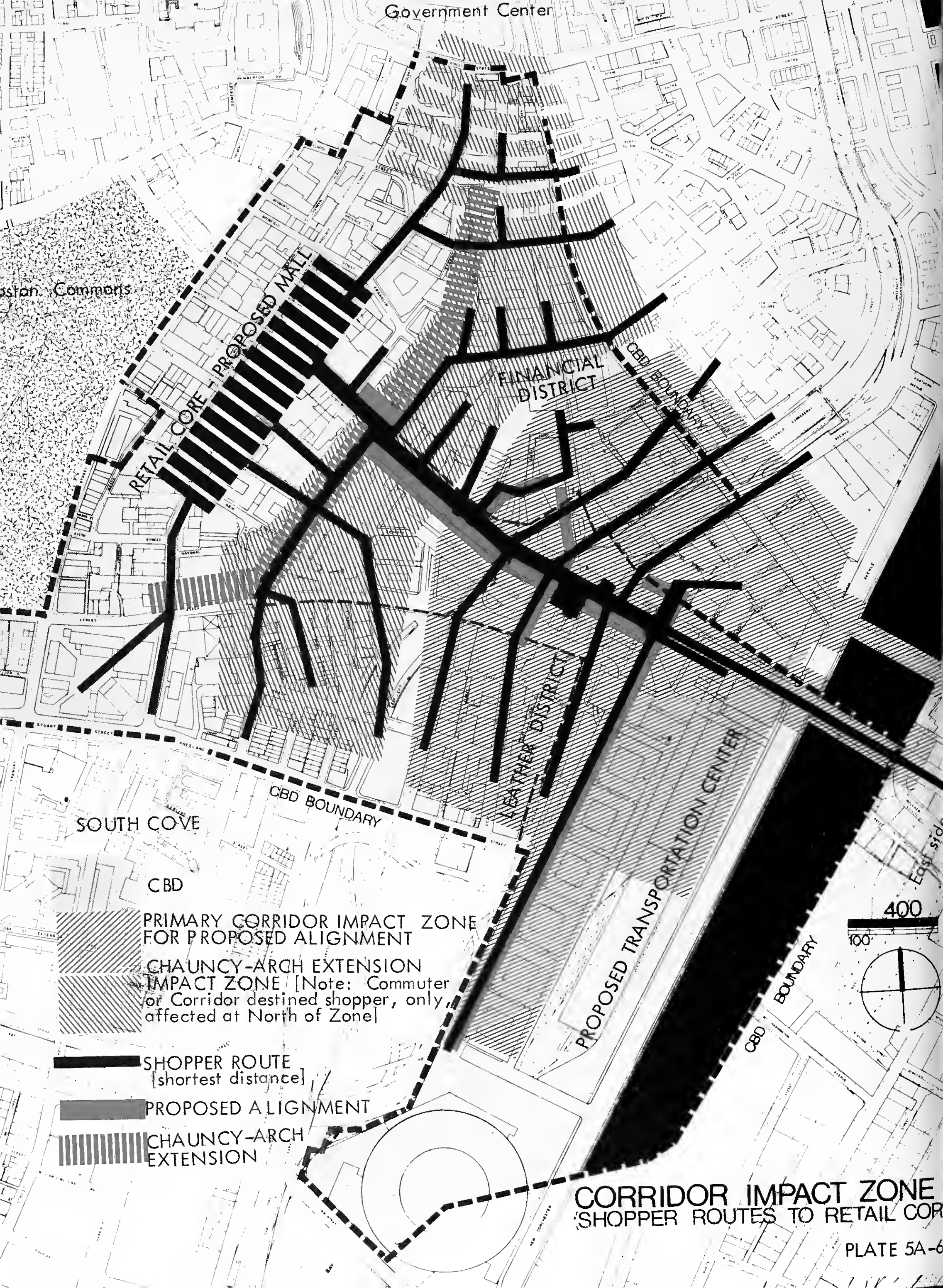
If the corridor is extended along Chauncy-Arch Streets, it may attract blue line - South Station users from the Government Center area. Such an extension would also serve transit system green line and orange line pedestrians in addition to shoppers.

Shopper: The corridor's impact zone for the shopper is approximated in Plate 5-6 following. This study assumes a shopper desire line toward the retail core during the noon-hour, or the normal shopper traffic originating at the transportation center. The sphere of influence would be extended should a Chauncy-Arch Street extension become feasible. Increased travel time-distance capacity afforded the pedestrian by the corridor is certain to improve general accessibility of the retail core during the noon-hour. The corridor itself, again depending upon its developers, can become a major shopper destination. Retail frontage developed within the corridor is certain to benefit by exposure from new office developments within the corridor or adjacent and the normal Summer Street pedestrian.

Alignment: The above user types are well-served by the proposed alignment position within the study area. Transit-destined users have no impact on alignment preference as all alternates examined have connected directly to stations. The transit system is anticipated by the transportation consultants to increase in importance and definitely become the prime generator of corridor traffic. Positioning of the corridor along Summer Street assures a continued overall pedestrian use during the course of a day with the variety of users and the 3 user 'peak hours' expected.



TYPICAL TRAFFIC STUDY COMPOSITE



CORRIDOR IMPACT ZONE
SHOPPER ROUTES TO RETAIL COR

PLATE 5A-6

CORRIDOR IMPACT ZONE

COMMUTER ROUTES TO SOUTH STATION TRANSPORATION CENTER

PLATE 5A-7

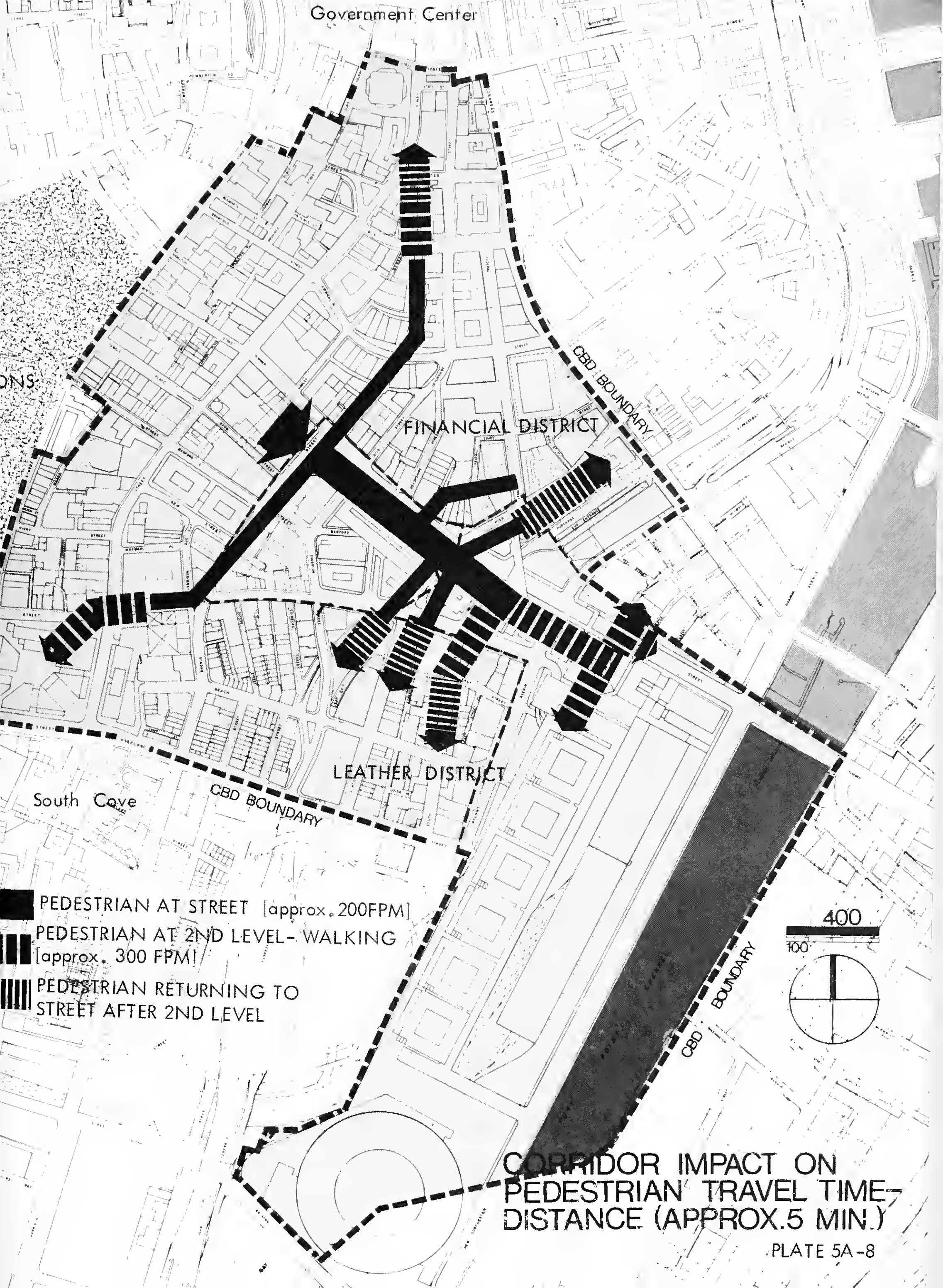
CORRIDOR IMPACT ON PEDESTRIAN TIME-DISTANCE CAPACITY (APPROX. 5 MIN.):

THE TRANSPORTATION CONSULTANT, MURRAY D. SEGAL, ADVISES THAT SIMPLE SEPARATION OF THE PEDESTRIAN FROM THE STREET LEVEL AND ITS CONFLICTS INCREASES ACTUAL WALKING DISTANCE CAPABILITIES WITHIN THE SAME TIME SPAN BY 50%. A SECOND LEVEL PEDESTRIAN SYSTEM THEN AFFORDS CONSIDERABLE IMPACT IN INCREASING CBD ACCESSIBILITY FROM THE CORRIDOR AXIS.

DIAGRAM (PLATE 17) SUGGESTS THE EXTENSION OF DISTANCE THAT A PEDESTRIAN UTILIZING THE CORRIDOR MIGHT GAIN COMPARED TO HIS USING THE NORMAL STREET SYSTEM (APPROX. 5 MINUTES WALKING TIME: 200 FPM STREET INCREASED TO 300 FPM ON CORRIDOR.)

CURRENT MOVING BELT TECHNOLOGY AND TRAVEL SPEEDS DOES NOT APPEAR TO INCREASE THIS CAPABILITY UNLESS A SYSTEM OF AT LEAST 6.5 FPS WERE INTRODUCED. THE MOVEMENT SYSTEM IS THEN ESSENTIALLY INTRODUCED FOR ITS PSYCHOLOGICAL FACTORS AND THE CONCURRENT SENSE OF "EASE" OR REST IT AFFORDS THE WALKER.

IT IS STRONGLY URGED THAT THE CITY, IN THE EVENT THAT A MECHANICAL MOVEMENT SYSTEM DOES NOT SEEM FEASIBLE, MOST SERIOUSLY CONSIDER PLANNING AND CONSTRUCTION OF A 2ND LEVEL PEDESTRIAN NETWORK WITH ITS ABILITIES TO RESPOND TO CBD AND CADS BASIC OBJECTIVES IMMEDIATELY. IT IS PARTICULARLY TIMELY THAT SUCH NETWORK BE INITIATED DURING THIS PERIOD OF GROWTH AND CHANGE IN THE CITY.



CORRIDOR IMPACT ON PEDESTRIAN TRAVEL TIME-DISTANCE (APPROX.5 MIN.)

PLATE 5A-8

The proposed corridor alignment is permissive of the City's establishing and delineating on a continuing basis its priorities and objectives for growth and development within the CBD. It does not, in contradistinction to other alignments examined, exclude a range of possibilities.

Corridor alignment can (1) appreciably influence channel development, (2) establish ease of access to the financial district north and its development, (3) influence leather district development, and (4) anticipate CADS extension capability and clarity. It is permissive of a range of planning intentions and priorities, and also is capable of responding to long range objectives for supplementary service throughout the CBD and abutting areas in a simple and clear routing.

Its connection to the transportation center suggests a major pedestrian terminus with potential for extension and access to the channel, anticipating its development. This connection may or may not integrate with the building envelope depending upon the extent of the Transportation Center redesign required and the exact street alignment. It establishes a decided pedestrian arrival point and transition between pedestrian levels, requiring distinct and specific design analysis by the architect of the Transportation Center, above and beyond the needs of program in order to accommodate the corridor, in addition to careful coordination with the architect of the Federal Reserve across the street.

The alignment provides strong access potential to the northernmost part of the Financial District, but necessitates recognition of the Leather District via a pedestrian concourse thru the Dewey Square Tower. (It should be noted that this district receives exposure via an Atlantic Avenue edge alignment of the Transportation Center Corridor.)

The prominence lent to Dewey Square by this alignment suggests that the City feel obliged to encourage and implement development of the platform north of Summer Street above the Central Artery. Dewey Square can become a major open space land-bank for the City, with focal point to the new Keystone Building, serving the Financial District as well as its abutters. On the other hand, an alternate development of low construction as permitted structurally by the Central Artery could achieve urban closure of Summer Street, and equally well be planned to serve the Financial District and Federal Street pedestrian.

3 major determinants of downtown development are real estate, or economic factors, accessibility factor and urban design considerations.

The impact of the corridor on urban form and development will still be strongly governed by the degree of control and planning exerted by the city in directing its growth. If the renewal area is regarded strictly from the economic point of view, in light of both its availability, location and accessibility, the study area in itself has the potential for becoming a very high density, high rise "corridor spine" along the Summer Street corridor axis. This new development "axis" will be bounded on all sides by either existing functional areas or their extensions. The new corridor promises to become a new "linear sub-area". Urban design considerations alone can affect this development.

It is doubtful that with the increased accessibility afforded by the corridor and increased land values that the present functional areas will maintain their present character. Aside from the retail core itself and the financial district proper, the texture and character

of the area is very uneven. Continued new construction, unless it yields to extensive urban design control, is not likely to distinguish the character of these sub-areas.

The corridor, by its ability to increase accessibility of the CBD and improve distribution will most certainly act strongly in revitalization of the business core.

One of the most distinctive characteristics of the downtown street is its tendency to terminate in a closed vista or turning. This characteristic of the "winding" street adds the potential of very special character and interest to the area. Such enclaves when punctuated with significant landmarks or character will add significantly to the identity of the CBD. At the same time, however, the enclaves can create confusion in orientation and some key or landmark, whether in character or place, is necessary to relate enclaves. The Summer Street corridor in its proposed straight alignment with the pedestrian level will act as both a new "enclave" and a terminus to abutting streets. The corridor will be especially evident at street crossings, etc.

Federal Street: It is recommended that Federal Street not be extended thru to the new Summer Street but be terminated at High Street in an enlarged parcel F-1. Much of the charm and and scale of Boston arises from controlled and often terminated inner city vistas and street views. Clear sight lines thru at least a two-story space incorporating the Federal Street extension of the Corridor are recommended in this parcel. Unless the entire parcel is developed in built structure, the building mass permitted within the suggested property lines creates an awkward half-closure at the foot of Federal Street. Relocation of these property lines to establish a continuous and clear vista down Federal Street so reduces the parcel in size that its development is questionable. Extension of Federal Street also develops it as a major corridor and carrier with an implied

[Top] ·Federal Street vista looking from Summer Street at Purchase Street;
[Bottom] Federal Street vista looking toward South Station with present Summer Street alignment.

major destination rather than as the limited service carrier its position and limitations dictate, and in addition weakens the potentially strong urban closure of Summer Street at the FI parcel.

Dewey Square Tower (Parcel D-7): Transit station connection, pedestrian concourse to the leather district, and corridor position place decided constraint and influence upon the character of the building's pedestrian level. Coordination with the present developer has established the ability of the Corridor proposal to adapt and integrate successfully with proposed construction. Section 5D - parcel constraints elaborates further.

This parcel must develop, in addition to clear connections with the transit, a major concourse connecting with the leather district, to ensure the Corridor's response to this sub-area.

Dewey Square: The photograph below taken from Summer Street [foreground] and looking north at Purchase is illustrative of the major swath cut in the City fabric by the Central Artery below surface, and an open path to the Northeast storms.

Dewey Square is the dominant space along Summer Street commanding views from the new Federal Reserve and Dewey Square Tower. The 'square' as it presently exists is one of the most unpleasant spaces in the CBD.

The parking at grade which spans the Central Artery is an eyesore from the street level and ev[en] more so from the proposed new office buildings that will abut it.

Development of the 2nd level pedestrian system offers an opportunity to assess the structure of Dewey Square in a new context.

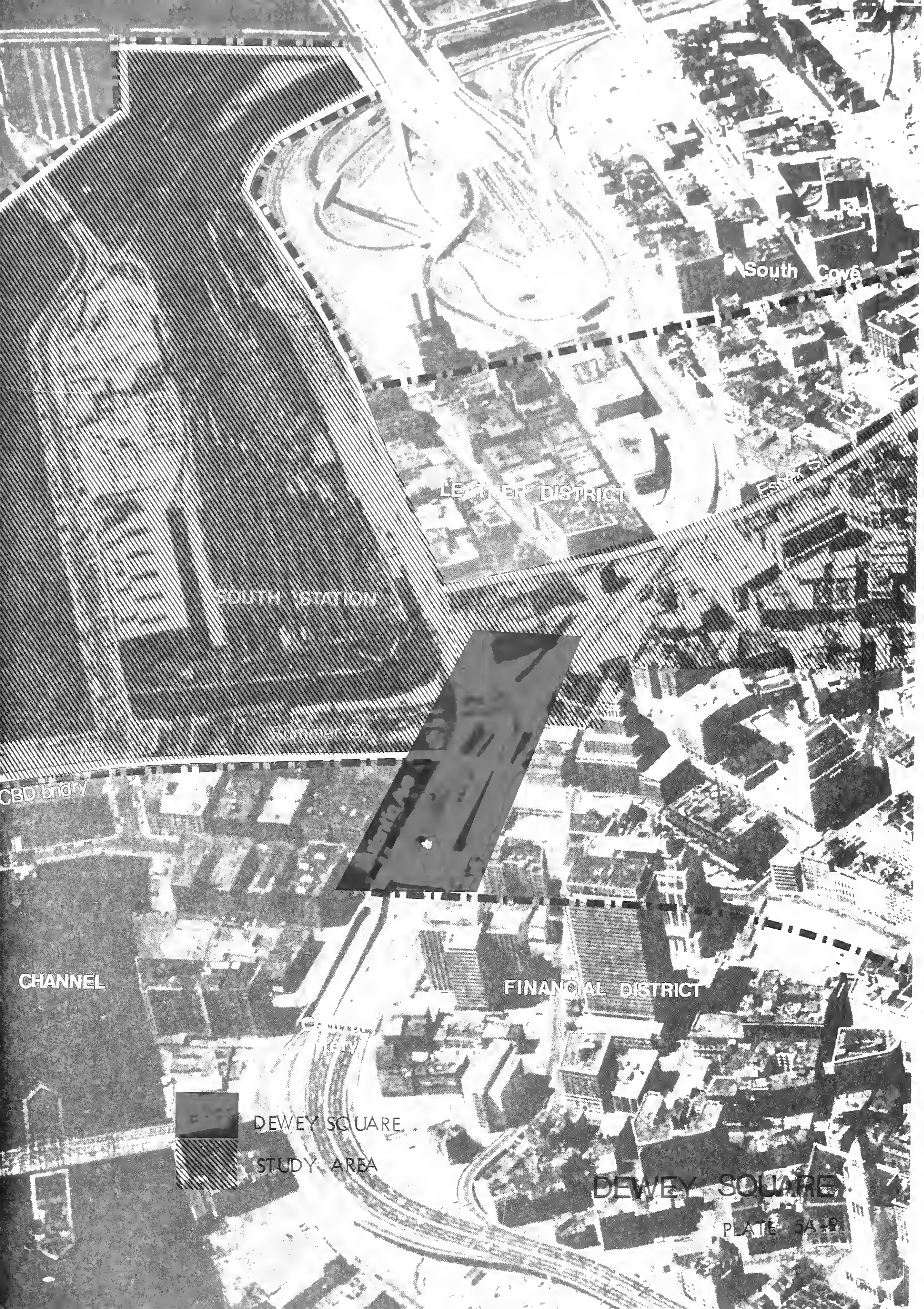
Pedestrian origin-destination studies have suppo[rt]ed location of bridges allowing free circulation from the Transportation Center and Corridor to t[he] Financial District. Extension of an elevated pe[d]estrian level is recommended toward Federal Street at parcels F1 or F2 and, via the Federal Reserve, toward Congress Street.

One possible approach which would contribute [to] urban closure at grade would be the constructio[n] of a 2 level air-rights structure with parking at grade, and commercial at a partial 2nd level (t[he] Central Artery below restricts further construction), and a roofscape park at 2nd level and roo[f] greatly improving the present appearance. The [roof] level of such an air-rights structure could contr[i]bute a necessary urban circulation corridor to both Federal and Congress Streets. Some slight tax return might accrue to the City.

An alternative would be development of a surfa[ce] level park shared by abutters.

Feasibility of air-rights construction should be investigated just north of the present platform s[o] as to achieve closure of the Square and develop a major CBD land bank.

Dewey Square can be envisaged as a 'hub' to th[e] pedestrian network.


South Cove
LEATHER DISTRICT
SOUTH STATION
Summer St
CBD bndry
CHANNEL
FINANCIAL DISTRICT
DEWEY SQUARE
STUDY AREA
DEWEY SQUARE
PLATE 5A-9

CORRIDOR EXTENSION:

Consideration should be given to the extension capability of the Corridor beyond study area boundaries, and this program be regarded as an initial increment of a well-integrated 1st and 2nd level pedestrian network in the City.

Leather District: The Corridor should be readily accessible to the Leather District by bridge or extension.

Chauncy-Arch Street Extension: Proposed widening and/or re-alignment of Chauncy-Arch Streets affords the opportunity for extending a 2nd level pedestrian system north and south, implementing flow along the Government Center-South Cove axis. It is unlikely that such extension would require a movement system along its length; it would rather be regarded as a supplement to the proposed Washington Street Mall intended to collect pedestrians destined for the Corridor or Mall, relieving pedestrian and vehicle from the conflict on a street now proposed as a major thru-carrier and north-south distributor. Such extension capability should look toward the long range inclusion of hardware capable of forming a delivery 'loop' through the CBD completed on Congress and Stuart-Kneeland Streets should this implement CADS objectives.

Pedestrian volume flow statistics collected by Murray D. Segal for different periods of the day over existing street patterns identify Chauncy-Arch as major present north-south pedestrian collectors. This pattern may change when the proposed Mall is completed, but the physical position points to continued pedestrian volume.

Avon Street: Extension of a 2nd level pedestrian way from Chauncy to the Washington Street Mall would greatly enhance the Mall and provide a closure to the projected delivery

and service trucking area to Jordan Marsh. This street is presently inactive, used largely for delivery function or truck holding, and should the practice continue when the street became 'dead-ended' with the implementation of the Mall, it would exert a decidedly detrimental environmental effect on the Mall.

Avon Street has an interesting vista up to the Commons and with proper development of its connection between Mall and 2nd level could afford a contribution to a pedestrian network. It presently appears to have no appreciable volume of pedestrian use (although as an extension of a network a volume can be anticipated), which suggests alternate uses might be considered--e.g., gallery to abutting structures, making reasonable level connections; public or semi-public activities, i.e., information center, galleria, restaurant, etc.

Fort Point Channel Extension: Dependent upon delineation of its role as a permanent waterway with potential attraction for residential, recreational, and water transit uses; its relationship as a terminus and edge to the CBD; and as a 'destination' from the CBD; and the desired relationship to development accessibility and growth on the east side of the Channel.

The greatly increased accessibility afforded the CBD by a Summer Street pedestrian Corridor suggests that clear pedestrian connections to the Channel might be regarded as 'necessary' service to this area and should anticipate the fact. It appears inevitable from the physical relationship to the CBD, the major vehicular axis, Central Artery access-egress patterns etc., that the Channel and south Boston will develop. A Corridor extension would not only recognize and anticipate such development, but encourage it.

Congress Street Extension Serving the Financial District: A clear pedestrian ROW in the Federal Reserve Parcel north from the Transportation Center to Congress Street would greatly increase accessibility of the Financial District. An alternative is proper development of the Central Artery platform for pedestrian use.

FEDERAL RESERVE PARCEL:

GENERAL: THIS PARCEL WILL NEED TO COORDINATE WITH THE PORT AUTHORITY IN RECEIVING A BRIDGE CONNECTION OVER SUMMER STREET, AND WITH THE DEVELOPER OF PARCEL F-2 ABOVE THE CENTRAL ARTERY. IT WILL HARBOR A MAJOR PEDESTRIAN GENERATOR IN THE TRANSIT STATION AT THE CORNER OF SUMMER STREET AND ATLANTIC AVENUE, AND SHOULD ANTICIPATE, IF NOT IMMEDIATELY PROVIDE, CORRIDOR EXTENSION CAPABILITY AT GRADE OR 2ND LEVEL TO BOTH THE CHANNEL CORNER AND CONGRESS STREET FROM THE SUMMER STREET BRIDGE.

BRIDGE [SUMMER STREET]:
The parcel must coordinate with the Port Authority in receiving a major pedestrian bridge (without weather protection] approximately 30'-0" in width at concourse level within the Transportation Center). This is approximately 25 feet above arade, - a lower elevation is preferred (± el. 36) if a continuous surface connection via ramp can be provided at South Station in transition between the concourse and el. 36 to permit uninhibited pedestrian movement. If not, such ramping will need to be integrated into planning at the Federal Reserve parcel (approximate el. 20 to 23 at Channel).

STAIRS:
Stairs are to be provided at street intersections (minimum widths to be established).

TRANSIT STATION:
A major transit connection is to be incorporated in a direct and simple manner acceptable to all parties at the corner of Summer Street and Atlantic Avenue collecting pedestrians both at grade and from the Summer Street bridge. This connection must include a pair of escalators to the main corridor level and stairs of 12'-0" width.

CORRIDOR EXTENSION:
Channel: A major surface pedestrian way should be planned between the Summer Street bridge and the Channel corner. (approx. 14'-0" width in addition to the normal sidewalk) Grade or 2nd level is acceptable according to tower planning needs.

Congress Street: A clear R.O.W. of approximately 18'-0" in a direct connection between the South Station Bridge and the Congress-Atlantic corner vicinity should be provided. This extension need not be weather-protected, but the 2nd level is preferred in order to provide a bridge crossing at streets in crossing the Central Artery.

This north extension will draw a high volume of users commuting to the transit station and South Station, and generally increase accessibility in the CBD.

If development of the Central Artery platform can be committed, the north extension to Congress Street may be accomplished at grade or 2nd level within that parcel.

Frontage: It is strongly urged that the Federal Reserve consider incorporating active commercial frontage along routes receiving heavy pedestrian traffic in keeping with overall planning attitudes within the CBD.

Section 5B

SUMMER STREET CORRIDOR
CORRIDOR PLANNING DEVELOPMENT

Table of Contents:

CORRIDOR DESIGN DEVELOPMENT RECOGNIZED AND INCORPORATED THE FOLLOWING DESIGN OR PERFORMANCE CONSIDERATIONS:

R.O.W.: The pedestrian corridor would occur within building envelopes and property lines for these reasons:

[1] Maximize overall buildable space within the urban density of the CBD;

[2] Integrate with building structures so as to minimize the need for any special structural considerations;

[3] Capitalize upon climatological protection afforded the Corridor by building envelopes thru which it passed;

[4] Preserve traditional urban closure to street and the urban character of downtown Boston;

[5] Vehicular sight lines and Safety: Provide greater safety to traffic at street intersections than if the pedestrian system were outside envelopes and property lines;

[6] Phasing: Optimize phasing potential.

CLEARANCES: Minimum 14'-6" clearance of structures over City streets.

CONTINUITY OF WALKING MODE: The corridor must permit pedestrian to walk the length of the Corridor should he prefer not to use the movement system. This is suggested as [1] response to pedestrian choosing the convenience of a second level pedestrian way, [2] response to the handicapped pedestrian not able to negotiate the movement system, [3] support of the commercial viability encouraged by continuous accessibility to all pedestrian types, and [4] implementing pedestrian flow and maintenance of system during system down time.

SAFETY: Design and maintenance to prevent accidents.

THE HANDICAPPED: Although the movement system itself cannot receive a certain percentile of users, - the corridor as a whole should not be restrictive to the handicapped or elderly. Conventional pedestrian crossing alternatives should be provided from block to block to accommodate those pedestrians choosing for one reason or another not to use the movement system.

MOVEMENT SYSTEM: Planning need recognize the constraints and considerations delineated in the following section on the movement system, in addition to provision of straight line right-of-ways for belt segments.

CORRIDOR CHARACTER AND CONTINUITY:

Pedestrian Experience of Continuity: Pedestrian experience of continuity within the Corridor itself will derive from continuity of [1] walking surface materials, [2] lighting, [3] graphics and colour, [4] rails and balustrades, [5] bridge and access elements, [6] closure system. Of these items [4], [5] and [6] should be consistent and recognizable with identity apart from the building structure or context within which the corridor is found in order to be understood as a natural extension of the pedestrian level itself.

Recognition of certain 'intangibles' contributes considerably toward establishing planning continuity and character:
[1] Movement: As an activity-function designating 'place';
[2] Rhythm: Rhythmic colonnade characteristics yielded by the surrounding structure consistent with reinforcing the sense of 'walking' and 'progressing in time and distance'.
[3] Connectiveness: Visual and spatial connectiveness as understood from within and without;
[4] Sense of place: Function and identity;
[5] Mood: Light, texture, colour, activity, character, etc.

Experience of Corridor continuity by vehicle or occupant of the street: Primary contributors to pedestrian system continuity as experienced by the occupant of the street level or vehicle are the consistency of:
[1] Balustrade and bridge material, colour, and connectiveness;
[2] Weather protection elements;
[3] Physical continuity and identity as a 'level';
[4] Recognizable and related 'access points';
[5] Spatial characteristics relative to the street.

Frontage Use: Frontage along the second level should be encouraged to be as 'active' as possible; occupancies which would be open evenings would enhance the corridor. Secondary access or frontage uses are proposed at Grade,-primary at second, although sufficient provision for major connection of these levels should permit unusual and attractive frontage possiblities at grade.

LIGHT: Light source and quality are regarded as primary contributers to the character, orientation and recognition capabilities of the corridor, and will assist immensely in establishing 'sense of place'.

Natural Light: It is recommended that the corridor depend extensively on natural lighting with its seasonal and cyclic changes during the course of the day to emphasize its continuity with the pedestrian experience of the City as a whole, and contribute the richness of mood experience which artificial sources can never match.

Night Lighting: Night lighting as occurs in the overall pedestrian network should provide

for usual safety and surveillance, but the quality of such lighting should be 'warm' in colour, unobtrusive in source, and of low intensity:

[1] Warmth: Warm colour to bring out natural tones of materials, complexions, and establish the corridor as an attractive place;

[2] Unobtrusive: Minimize or eliminate the use of 'fixtures', substituting 'light sources' which do not become obsolescent with time, difficult to maintain and repair, and identified as conspicuous elements in the corridor. [It is important for perceptual reasons to minimize the number of elements within the corridor.] Hardware and components ought not to define the character and mood of a major permanent element in the City fabric;

[3] Low Intensity: The corridor at night must have sufficient illumination to provide for surveillance and safety of the pedestrian way, and be concentrated on 'surfaces' rather than on 'users' [the activity illuminated is 'walking']. Lighting level itself should permit the spatial experience to be an extension of the City fabric and not be of such brilliance that the pedestrian feels he has entered a special 'room' or appendage [Exception: Interior pedestrian corridors and terminals]. Shops fronting on the system should be encouraged to leave displays illuminated. Night functions, such as eating places, would contribute considerably to sense of place and character.

CORRIDOR GRAPHICS: Standard sizes, locations, typefaces, co-ordinated messages, in lit or illuminated panels will contribute to the overall character and effectiveness of the system's performance. Corridor design and planning should minimize the need for graphic orientation and information devices, but anticipate and provide convenient locations as necessary. Graphics requires a study in itself, especially to determine perceptual needs of the system user as distinct from the normal pedestrian.

HUMAN FACTORS: Integration of a movement system with normal pedestrian needs raises concern for identifying and understanding visual perceptual and visual vestibular aspects of both hardware and the interface between hardware and its context. Jackson & Moreland's Engineering Reports begin to delineate such areas of concern relative to the movement system itself [See Appendix B]. In part, these concerns are:

[1] Orderly visual atmosphere both on the moving walk and at access points to avoid pedestrian disorientation and illusory effects and assurance of observation of important information devices;

[2] Clear walking routes within the access point, identification of where the service is, and other required basic elements of information;

[3] Provision for the handicapped;

[4] Orientation structure-framework to relate the user to ground despite the motion of passengers on other belts or other pedestrian [the use of columns, for instance];

[5] Accident preventative design.

FLEXIBILITY:

Corridor Flexibility: The pedestrian system as a permanent and formgiving element of the City fabric, nevertheless over a period of time should be capable of responding to new demands and needs as they become apparent, especially since the area in which the Corridor is provided is undergoing considerable change and the extent and nature of this change, with the addition of the Corridor itself, cannot be gauged in exactitude. It is recommended that the Corridor be capable of extension at a number of points along its way so as to permit response to changing needs. The main corridor itself, might be regarded as reasonably fixed with the exception of capacity flexibility via movement system or capability to receive a system accommodating greater volume in the long range future as the need arises.

Access-egress points to the corridor, if at all possible, should be designed in such a way that should some major need or detriment be identified, these points can be relocated or added without special effort.

Construction Phasing Flexibility: The construction and implementation characteristics dictate phasing capability both physically and mechanically, as funding and parcel development permit.

Ability to accommodate technological change: Capability for receiving advanced modes of mechanical movement to the best of our knowledge should such modes become available.

Movement System Flexibility: "From time to time, adjustments in physical facilities of a guidance and convenience nature leading to and from might be made to determine effect. Basic objective would be to determine needs

and desires of persons served and whether system properly met those needs." (CADS p. 28)

Jackson and Moreland advise that the pedestrian corridor accommodate from the beginning the particular hardware to be examined in toto, with equipment capacity for optimum performance and speeds. A 6.5 ft./min. system can be readily slowed, whereas introduction of additional hardware elements during the course of time plus shutdown, will be costly.

Flexibility, then, would be directed toward ascertaining:

(1) Adaptability of user to different speeds
(2) Mechanical performance of system at different speeds

VANDALISM:

Planning of elements and selection of materials and components so as not to encourage neglect, vandalism, and damage -- and minimize the effect of same should it occur (e.g., replaceability, ease of removal, etc.).

Materials and components should be selected in such a way that should replacement be required, marketable products will be readily available without special construction or cost.

MOVEMENT SYSTEM MAINTENANCE:

Planning should attempt to minimize the effect of mechanical down-time on the overall pedestrian corridor, and design considerations for the movement system facilitate repairs and maintenance (e.g., ease of replacement of parts, extensive use of replaceable components which can be centrally serviced, accessibility of elements likely to require repair or service.

ENVIRONMENTAL:

Separation of pedestrian from the noise and pollution of the street, summer heat, winter weather, dirt, etc. This opportunity exists because of the urban renewal context.

ENVIRONMENTAL CONTROL:

Provide sufficient weather protection from the elements to ensure corridor attractiveness to the pedestrian and system user in inclement weather, and protection of the movement system from primary exposure to moisture, salt, dirt and ice.

The corridor shall conform as closely as possible in nature to the climatological experience of the city streets, with the exception that it will be 'weather-protected' and at all times present a slightly more desirable alternative than the normal sidewalk level.

GENERAL: CORRIDOR DESIGN DEVELOPMENT IS SERIOUSLY DICTATED BY THE NEED TO ACCOMMODATE THE MOVEMENT SYSTEM, AND IN THIS CASE, THE NEED TO PLAN FOR SEVERAL SUCH SYSTEMS PENDING SELECTION OF THE FINAL SYSTEM.

THE SUMMARY THAT FOLLOWS IS PARTIALLY DRAWN FROM THE ENGINEERING CONSULTANT REPORTS AND INSERTED HERE BY WAY OF ILLUSTRATING THE SYSTEM ALTERNATIVES: [1] CONVENTIONAL MOVING BELT SYSTEM, [2] LINEAR MULTIPLE BELT - ACCELERATED SYSTEM, AND [3] CONSTANT SPEED LINEAR ACCELERATION. PLEASE REFER TO THESE REPORTS FOR ADDITIONAL CLARIFICATION.

MOVING WALKS: MOVING WALKS CONSIST OF A PASSENGER-CARRYING BELT, PLATFORM OR TREAD PLATE WHICH MOVE CONTINUOUSLY IN A FIXED GUIDEWAY. SYSTEMS MAY BE EITHER HORIZONTAL, OR INCLINED AS IN RAMP INSTALLATIONS. THEY ARE ESSENTIALLY LINEAR SYSTEMS: PASSENGERS ENTER, TRAVEL IN A STRAIGHT LINE, STANDING OR WALKING ALONG THE BELT SURFACE, AND EXIT FROM THE ENDS OF THE SYSTEM.

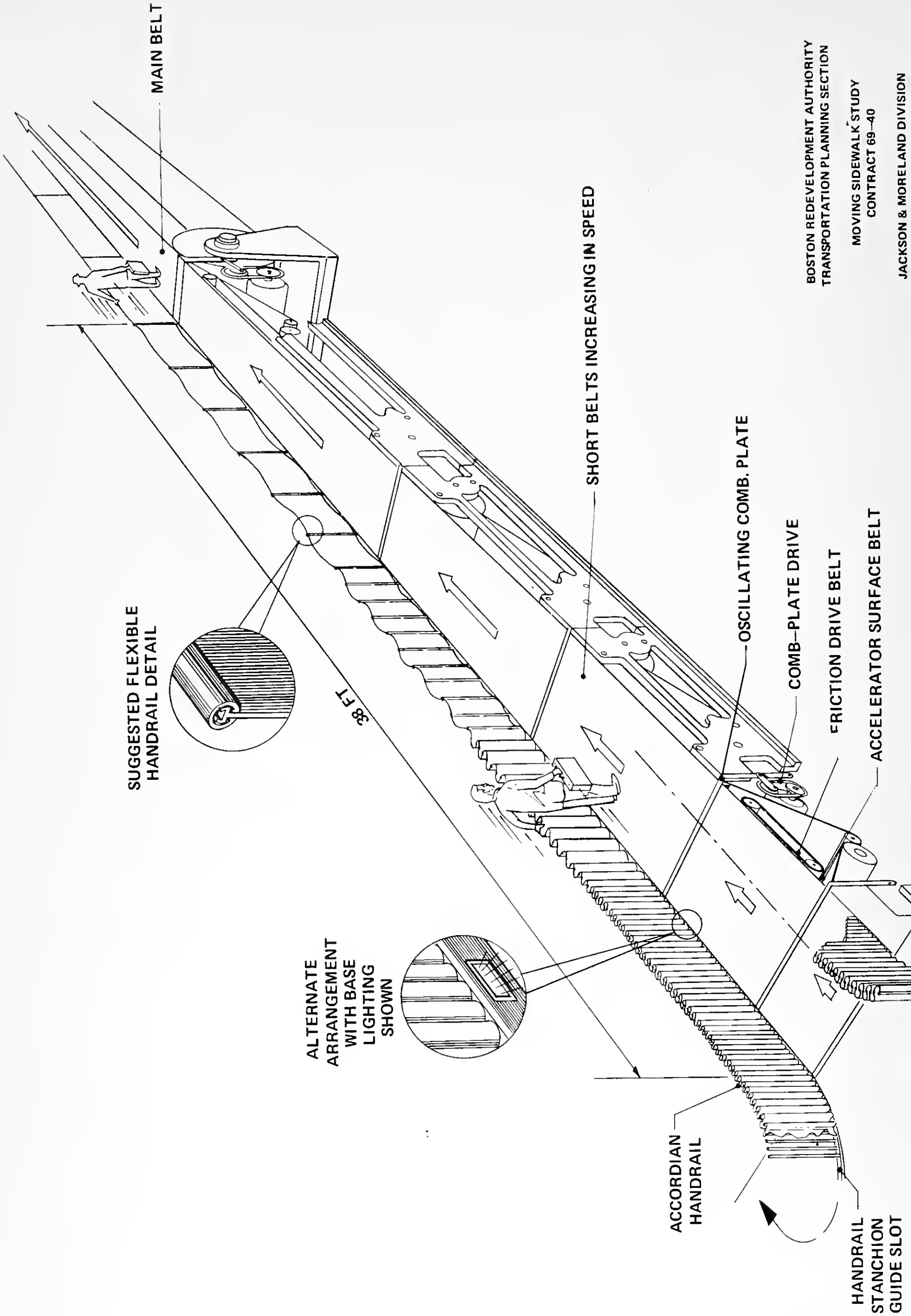
DESCRIPTION - SYSTEM TYPES BASED UPON ENGINEERING CONSULTANT REPORT:
[See Engineering Reports for Amplification]

[1] CONSTANT-SPEED MOVING WALK: OF ALL THE SYSTEMS, THE CONSTANT-SPEED LINEAR MOVING WALK IS THE ONLY ONE PRESENTLY AVAILABLE COMMERCIALLY ON AN OPERATIONAL BASIS. IT EMPLOYS AN AXIALLY GROOVED FLAT RUBBER OR METAL SURFACE TO MOVE PEDESTRIANS FROM START TO DESTINATION WITHOUT CHANGE IN SPEED OR DIRECTION. PEDESTRIANS ENTER THE MOVING WALK AND STAND OR WALK ALONG THE BELT SURFACE. THE PEDESTRIANS WALK OFF OR ARE 'SLID' OFF AT EXIT OR DESTINATION POINTS. METAL COMBPLATES MESH WITH BELT GROOVES TO CLEAR FOOTWEAR, ANIMAL PAWS, CLOTHING AND DEBRIS FROM THE MOVING BELT. COMBPLATES ARE FIXED AXIALLY ON ALL SYSTEMS.

[2] MULTIPLE BELTS - LINEAR ARRAY: "A SERIES OF SHORT BELTS IN A LINEAR ARRAY IN THE INITIAL AND FINAL SECTIONS WITH A LONG, MAIN BELT INCLUDED IN BETWEEN THE LINEAR ARRAY. THE BELTS ARE GROOVED TO ACCEPT COMBPLATES. IN THE INITIAL ACCELERATING SECTION, EACH SUCCEEDING BELT IS LONGER AND RUNS FASTER THAN ITS PREDECESSOR. THE LAST SHORT BELT DISCHARGES ONTO THE LONG BELT FOR THE CONSTANT SPEED RUN. THE LONG BELT RUNS AT 3.5 TO 6.5 FT. PER SECOND. A COMB PLATE IS LOCATED BETWEEN EACH PAIR OF BELTS TO FORM A CONTINUOUS MOVING WALK SURFACE. COMB PLATES OSCILLATE BOTH AXIALLY AND VERTICALLY IN ORDER TO PREVENT HAND UP OF PEDESTRIAN SHOES, REDUCING THE PRESSURE OF SHOES TO ZERO."

"All of the components have approximate historical precedents in the range contemplated for the proposed moving walk solutions. The design for an oscillating comb-plate system could proceed immediately were it not for questions about the exact values of human-machine interface data. The requirements are predictable and should introduce no more than normal des- and manufacturing difficulties". [Jackson & Moreland, Working Paper No. 3]

[3] CONSTANT LINEAR ACCELERATION: SYSTEM ACCELERATES THE PEDESTRIAN AT A CONSTANT RATE FROM ZERO SPEED, WHERE ENTERING THE MOVING WALK FROM THE PLATFORM FLOOR, TO THE SPEED OF THE MOVING WALK. THE BASIC ARRANGEMENT CONSISTS OF AN ELASTIC APRON WITH A DOUBLE ARRAY OF RIBS STRETCHING AXIALLY FROM THE ENTRANCE TO THE COMBPLATE AT THE POINT OF ENTRY TO THE WALK.



BOSTON REDEVELOPMENT AUTHORITY
TRANSPORTATION PLANNING SECTION

MOVING SIDEWALK STUDY
CONTRACT 69–40

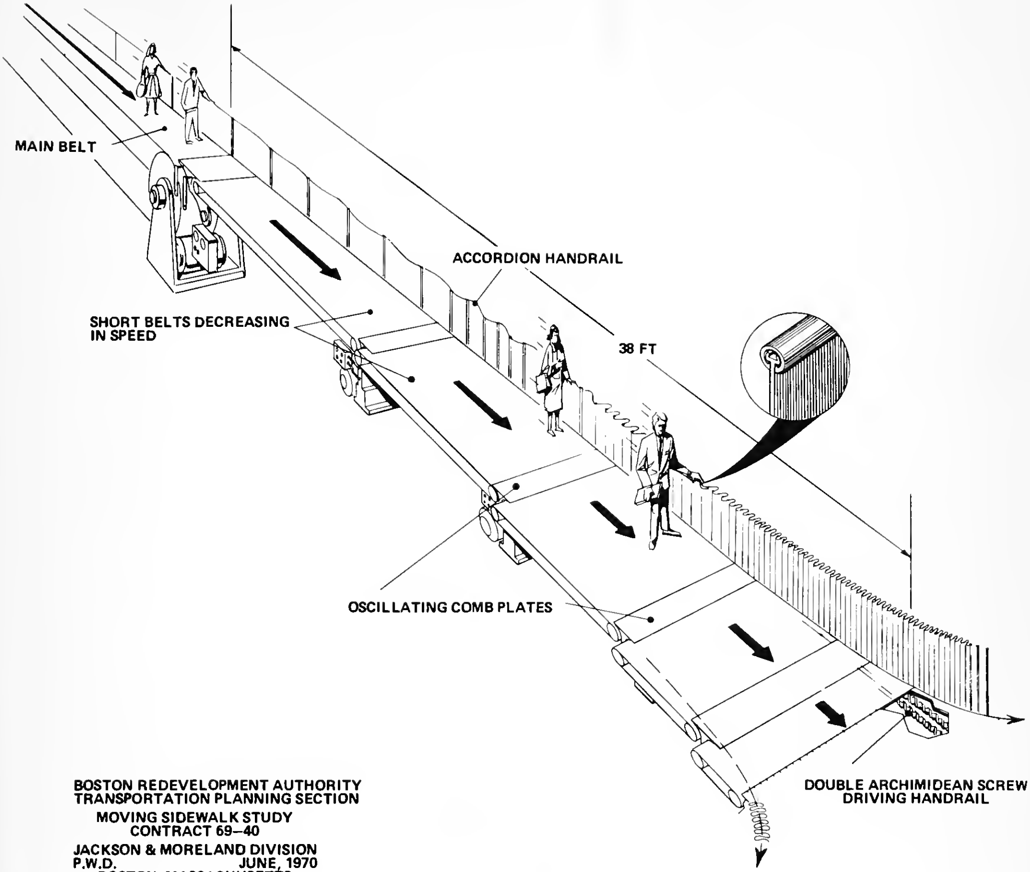
JACKSON & MORELAND DIVISION
P.W.D. MAY 1, 1970
BOSTON, MASSACHUSETTS

NOTE: Dimensions Are Approximate and Depend On Further Analysis

SKETCH I MULTIPLE BELTS – LINEAR ARRAY

ACCELERATED SYSTEM – ENTRY MULTIPLE BELTS – LINEAR ARRAY

PLATE 5B-1



BOSTON REDEVELOPMENT AUTHORITY
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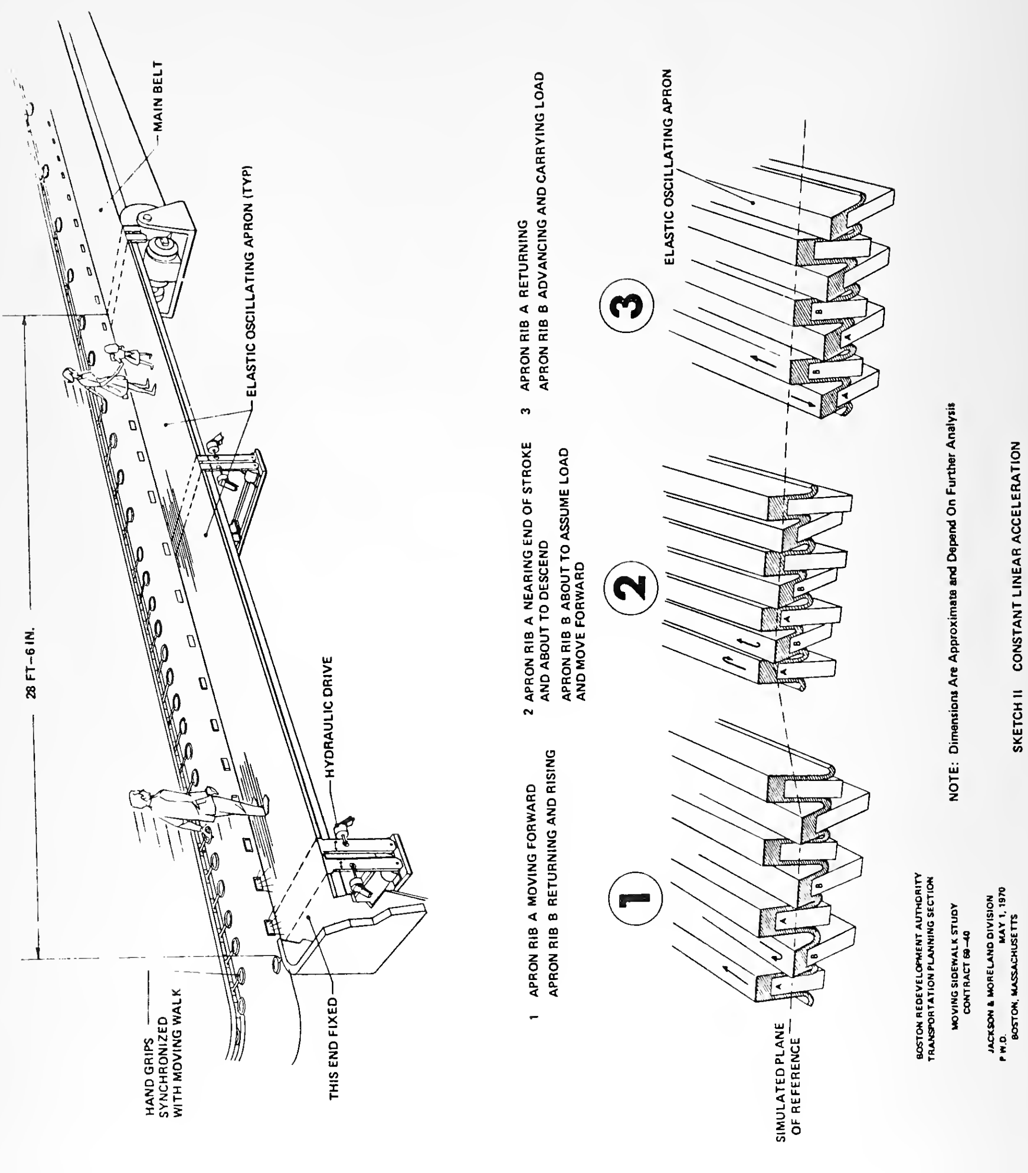
CONTRACT 69–40
JACKSON & MORELAND DIVISION
P.W.D. JUNE, 1970
BOSTON, MASSACHUSETTS

SKETCH I MULTIPLE BELTS – LINEAR ARRAY – EXIT

NOTE: Dimensions Are Approximate and Depend On Further Analysis

ACCELERATED SYSTEM – EXIT
MULTIPLE BELTS – LINEAR ARRAY

PLATE 5B–2

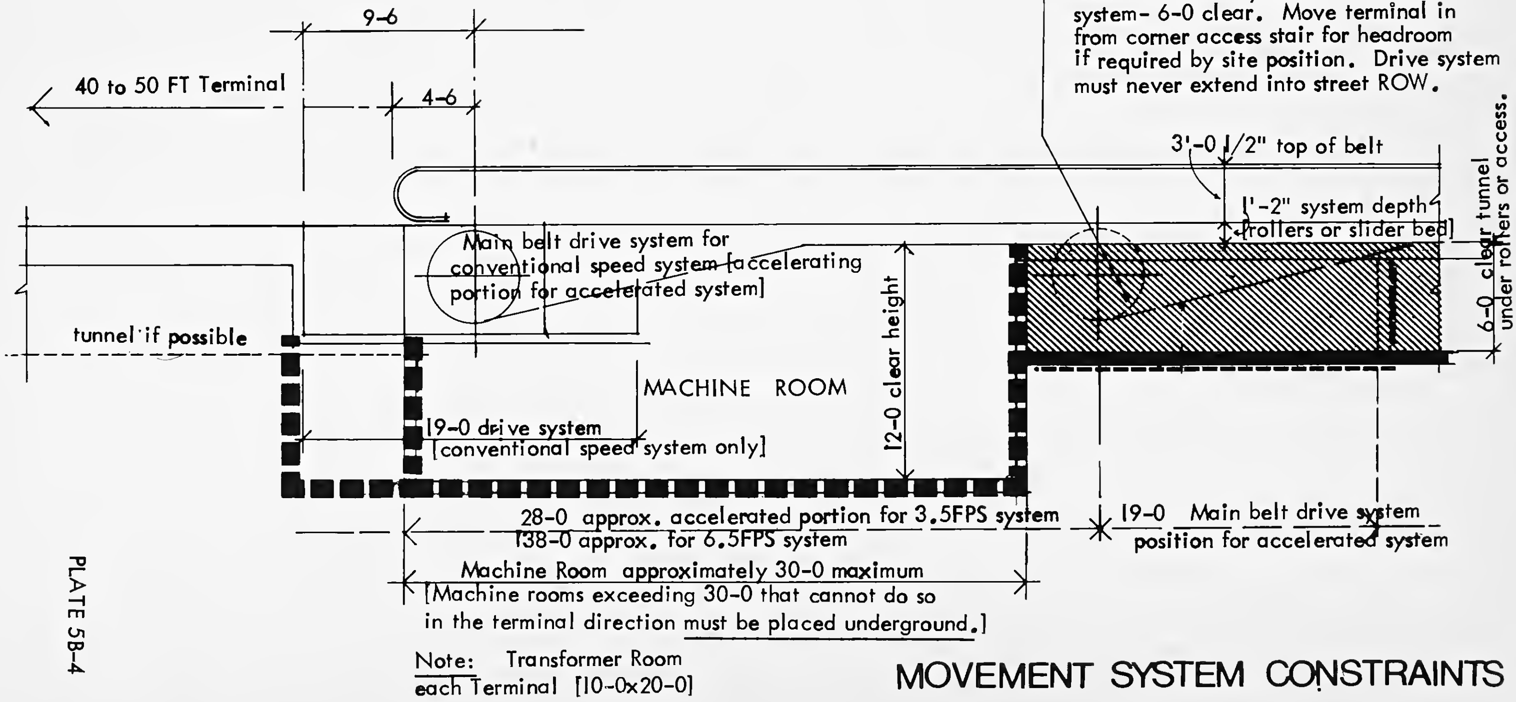


ACCELERATED SYSTEM – ENTRY
CONSTANT LINEAR ACCELERATION

PLATE 5B-3

Constraints indicated on this drawing are tentative only, subject to final system selection and actual design.

It is recommended that a performance specification when developed for the system include design dimensional constraints suitable to the project area.



MOVEMENT SYSTEM CONSTRAINTS

Treads and Base Structures: Treads and base structures should be kept visually dark enough to prevent the 'free-floating' feeling due to moving walk motion.

Orientation: Provision should be made between belts for a structure or ornamentation which will relate passengers to the ground despite the movement of other passengers on adjacent moving belts. These features should interfere as little as possible with an open view out of the moving walk.

Ventilation: High pit temperature can cause overheating of motors and system down time. Ventilation should be provided both at machine rooms and throughout the length of the system.

Temperature: Extreme temperatures can affect operations through dimensional changes.

Protection from Elements: Water corrosion: Water and salt generally corrode parts, both external and internal. Ice can be a problem, interfering with operation of safety switches.

Design of Balustrades: Protruding edges present sources of potential danger to users. Methods of attachment lend themselves to vandalism, yet maintenance can be a headache if removal and replacement are tedious.

Service and Maintenance: A continuous service/access way is recommended by the Engineering Consultants for the length of the system. A preferable clear height of 6'-0" is advised, with a minimum of 2'-6" crawl space under rollers. Where such preferable access cannot be provided [eg. bridges], sliders may be substituted for rollers. Sliders result in increased cost in equipment and horsepower requirements, however, for distances beyond 80 to 100 feet.

IMPACT OF ACCELERATED SYSTEMS ON CORRIDOR PLANNING:

General: Accelerated systems exert constraints on corridor planning and vertical alignment due to access requirements, service access needs, and the necessity of accommodating drive systems and machine rooms of greater length than required by conventional systems. The proposed 'flared' exit for the 6.5 ft.per second system intended to avert user pile-up at terminals separates belt positions and results in irregular lengths of belts with less than optimal access from the corridor in addition to extending drive system and machine room impact on the R.O.W.

Linear Belt - Multiple Array: Total length of the accelerating section [drive system] for a 6.5 ft. per second system including a standing combplate needs to be some 38'-0" long. This length must be doubled to include both this section and the decelerating section. The length of this section has a decided impact on corridor elevation above the street to accomodate drive systems, access points at terminals, and machine rooms within desireable planning locations. It further reduces prime commercial frontage at street level. The physical constraints of the site limit reasonable terminal locations.

Constant Linear Acceleration: Similar to above, excepting a shorter drive system.

Side loading: Side loading systems exert considerable impact on horizontal r.o.w., but as essentially continuous belts with side loading platforms negate the possibility of cross traffic and must be placed at a 3rd level. Short belt sections would be anachronistic. Approximately 30'-0" clear r.o.w. would be required between columns to receive 2 belts, one in either direction, with access platforms in between. Terminals could be located freely within the r.o.w., however, without limiting frontage potential.

Corridor Form: As linear systems, moving walks with their requirements for straight line paths definitely establish specific constraints on the form which the corridor can assume.

COMPARISON OF SYSTEM PARAMETERS
CARRYING CAPACITY AND SPACE REQUIREMENTS
[Extracted from Jackson and Moreland Report No.3]

	CONCEPT I Linear Belts & Comb-Plates	CONCEPT II Constant acceleration	CONCEPT IV Side Loading
Applicability	Good	Good	Doubtful
Design Implementation	Straightforward	Complicated	Complicated and Extensive
Construction	Straightforward	Complicated	Involved
Passenger Load and Unload Area	1,000 SF	750 SF	2,500SF
Total Accumulated Moving Walk Belt Length for 13 Belts	4,020 feet	4,020 feet	4,020 feet**
Belt Capacity [per Belt]	5,000 people per hour	5,000 people per hour	8,000 people per hour
Power [Installed Horse-power]	780	1,000	1,000
Cost [Present Market]*	$7,355,000	$7,855,000	$8,355,000
Cost of Initial 2 moving Walks [Present Market]	$1,709,000	$2,109,000	$2,609,000

* The average estimated installed cost of present constant-speed moving walk systems. ranges from $800 - $1,000 per lineal foot of length.

** At third floor level--all other systems at 2nd floor level.

RECOMMENDATIONS RELATIVE TO MOVEMENT SYSTEM SELECTION:

Jackson & Moreland (Work Order no. 3) recommends multiple linear belts as the accelerated-speed moving walk solution most straightforward, and best suited, for the CBD application. The recommendation is based upon the following factors:

[1] minimal mechanical complexity;

[2] predictability of mechanical requirements;

[3] optimization of moving belt and accelerated handrails;

[4] adaptability to relatively short walkway lengths on Summer Street;

[5] low transit time by pedestrians across comb plates;

[6] passenger safety, comfort and ease;

[7] cost.

"The recommended concept should prove the easiest of the solutions to support with field data, validate, design and engineer."

"Present low speed walks do not meet the requirements of the program [speed]. The maximum speed of 1-1/2 ft./min. is too slow for the transport of pedestrians over the distances under consideration in the CBD. This statement is supported by field observations." (Jackson & Moreland

TAC supports the above recommendations but expresses the following concern:

[1] The Handrail: In conventional walks, the handrails are a frequent source of difficulty: Jackson & Moreland cite slippage, derailment, squealing, vandalism and differential movement between handrail and moving belt. Handrail requirements for the proposed systems are complex at best, and with accelerated belts, they become possibly as major a design problem as the belt itself. The return move of the handrail is a particular problem lest it impose additional constraints and requirements on the depth of the system or right of way.

[2] Belt Speed as it concerns a flared egress configuration: 6.5 FPS systems are suggested as having flared egresses. TAC concerns are directed again to complexity of design, requirements for intermediate handrail or suspended straps, R.O.W. increases, and, due to linear offset requirements, increased terminal platform distances. TAC advises against the flared exits as a solution to the "stacking effect" and although finding the 6.5 FPS speed preferable, supports the 3.5 FPS speed alternative unless other solutions to the egress configurations can be considered feasible.

[3] Machine Rooms: Machine room lengths of 60 to 70 feet as required for either the 3.5 FPS or 6.5 FPS systems if placed at grade affect terminal locations as presently planned are reasonably equidistant and located for optimum accessibility. Machine rooms longer than 30-0 necessitate relocation of terminals above unless these machine rooms can be effectively placed below grade.

ACCESS TO CORRIDOR AND MOVEMENT SYSTEM: CRITERIA FOR ACCESS TO THE CORRIDOR AND TO THE MOVEMENT SYSTEM TERMINALS, USER ORIENTATION REQUIREMENTS, MOVEMENT SYSTEM CONSTRAINTS, AND THE DESIRE TO OPTIMIZE USEABLE COMMERCIAL FRONTAGE, EXERCISED PRIME INFLUENCE UPON CORRIDOR DEVELOPMENT.

PEDESTRIAN CORRIDOR ACCESS POINT LOCATION CRITERIA:

Legibility: Ease of recognition both from Summer Street and the streets immediately intersecting or serving the corridor area.

Frequency: Minimum of one access point per block in order to ensure pedestrian separation from vehicle and freedom of movement.

Commercial Viability: Locate access to optimize amount and quality of commercial frontage potential, using as an objective the criteria of exposure of pedestrian to this frontage while at the same time responding to his natural need to make his trip in the shortest distance.

Convenience: Locate in natural places of greatest need, eg.- major street crossings, MBTA, etc.

Pedestrian Flow: Minimize pedestrian flow conflict.

Permanence/Flexibility/Phasing: Locate in such positions as are appropriate to or implement phasing and construction.

Point of Origin: Respond to pedestrian generators, eg.- MBTA stations, etc.

MOVEMENT SYSTEM ACCESS POINT LOCATION CRITERIA:

Legibility: Ease of recognition.

Frequency: Provide opportunity for user to enter or leave system at reasonably frequent intervals: criteria for intervals is based upon 'user', 'system', 'development frontage', etc.

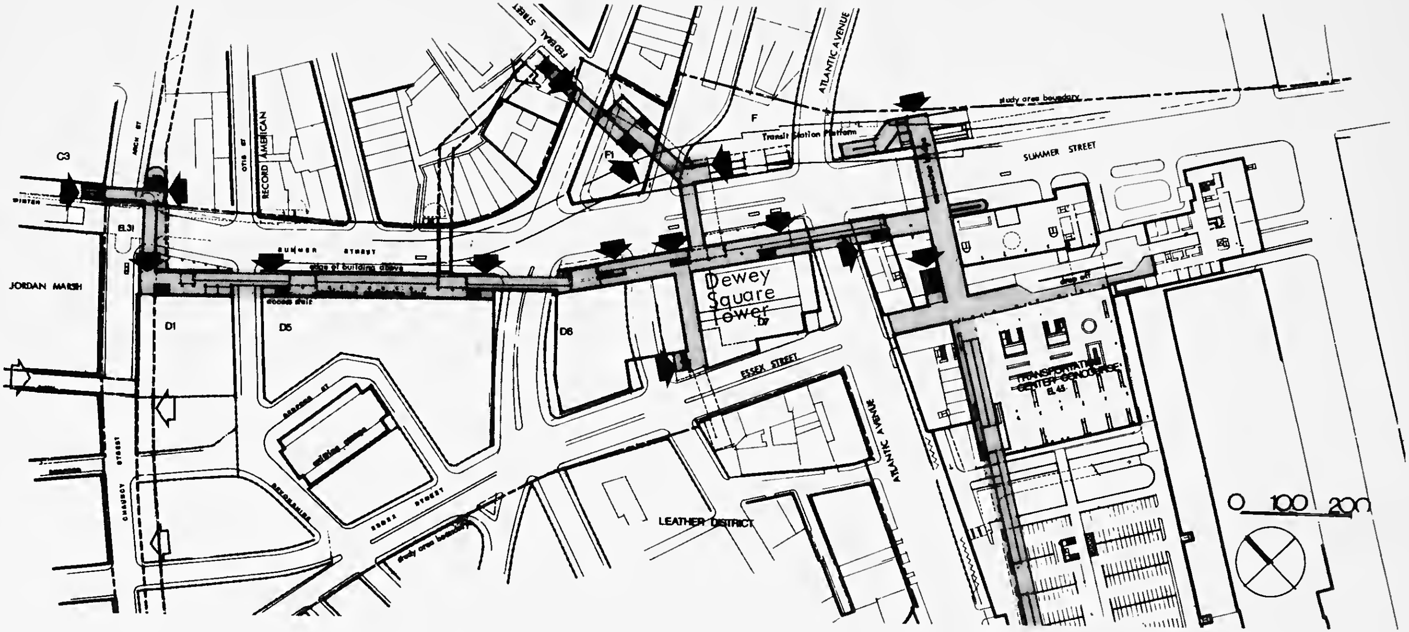
Convenience: Optimize convenience and availability of access.

Point of Origin: Respond as closely as possible to anticipated desire lines, points of origin, destination, etc., of pedestrian.

Commercial Viability: Locate terminals so as to optimize and encourage the amount and quality of commercial frontage potential, using as an objective the exposure of the system user to this frontage while at the same time responding to his need to make his trip efficiently.

Pedestrian Flow: Minimize pedestrian flow conflicts.

Drive System: Locate terminals to avoid increasing mean height of corridor above the street and to permit servicing of equipment. Machine rooms must fall within property lines and building envelopes.



CORRIDOR ACCESS

EXTENSION ACCESS

CORRIDOR ACCESS

GENERAL: The proposal in responding to planning objectives develops a continuous pedestrian Corridor one level above the street which will include a moving belt system with access at intersections, supplemented with connector bridges crossing Summer Street traffic at critical points. Pedestrians will be able to move freely from block to block within a weather protected comfort-heated environment, without crossing vehicular traffic lines and waiting at crowded intersections.

The proposed Corridor will be closely integrated with new development along its route, utilizing the protective cover and structural support afforded by the building thru which it will pass. Plexiglas barrel vaults at bridges will ensure continuous protection to users thruout the length of the pedestrian system.

The total Corridor system will be in 2 segments: that portion which will be integrated with the new Transportation Center complex along Atlantic Avenue, and that which will front on Summer Street between the Transportation Center complex and the Summer Street connection to the proposed Washington Street mall.

The Summer Street portion developed in this Section will connect near the Summer Street-Atlantic Avenue corner to the north-south axis of a Corridor within the Transportation Center complex.

The Corridor incorporates a pair of moving walks, arranged in segments with access-egress terminals at regular intervals throughout the Corridor. Segment lengths were determined by relationship to optimal Corridor access points (Plate 5B-5), machine room requirements at terminals, relationship to viable commercial frontage potential along the Corridor route, and reasonable lengths of run for the system. Lengths of run were very much limited physically by the actual site condition, street alignment and cross street positions. The particular

lengths of run proposed optimize pedestrian access and service criteria very well, in addition to forming almost similar lengths of belt run, and affording best support of frontage access.

A continuous walkway for pedestrians choosing not to use the moving walk system has been provided alongside the belts, permitting pedestrians to traverse the entire length of the Corridor by foot.

Environmental control for comfort heating and snow melting and lighting elements are recessed in the ceiling of the Corridor. Plexiglas closure panels may be inserted at the street face at those points along the Corridor where a special need for wind and weather protection is demonstrated. It is recommended that this need be evaluated during or after completion of final design and implementation in order to better asses the peculiar effects of wind in a changing urban environment. It is particularly intended that the pedestrian Corridor be an 'outside' space, and an extension of the Summer Street context as a whole. Extensive closure would lessen the recognition and acceptance of the pedestrian level as a major public way and seriously affect its character.

Although planning has subordinated and integrated the Corridor within building envelopes along its route, it is intended that its identity and legibility be maintained both at Street level within the City fabric and within the Corridor itself.

It is recommended that the paving surface of the Corridor throughout its length be warm coloured brick (preferable the 'old Boston' tone) coupled with inserts and treads of a warm granite. Exterior continuity of Corridor and bridges is to be maintained thru the use of precast concrete balustrade panels. Further elaboration upon specific design and aspects follows in Section 5D.

The height of the Corridor above its floor was responsive to Corridor scale and depth, its relationship to the scale of frontage to be found along its route and the possibility of its sympathy to developers along the way relating floor levels to the Corridor, and the long range feasibility of incorporating a high speed system in the R.O.W. above the Corridor floor.

The concept in recognizing the 2nd level as including not only the movement system, but incorporating it within a major pedestrian Corridor creates an additional level of frontage along Summer Street. This level should develop the type of frontage which is dependent upon and complementary to the large volume of users both generated by development along the Corridor route and from its abutting districts. It should be recognized as a 'front door' to development along the route, coupling mutual need with pedestrian convenience and service.

Since the movement system requires continuous access from below for service to rollers, it is recommended that developers hold frontage at the street level between machine room blocks back from sidewalk lines to permit such access, unless they can propose other alternatives. This consideration particularly affects Parcel 5D. At such condition, intermediate stairs, which are above and beyond Corridor needs may be dropped from the Corridor level to grade alongside the moving walk, connecting development on each level.

The proposal represents a 'framework' or set of constraint relationships within which a moving walk is feasible in the Summer Street - South Station area of the CBD. It by no means constitutes a final design but delineates a set of relationships and goals which are felt essential to the success of the proposed pedestrian system. It is expected that the proposal will need to adapt to conditions encountered within specific building programs of the properties through

which it passes. These needs should be examined during final design and carefully reviewed by the Authority. Special considerations must not be made without examining the entire Corridor and its best functioning in light of both its planning criteria and objectives within the CBD. Success can only be guaranteed by full cooperation between City, developers and all parties concerned with an understanding of common goals. (Specific design aspects are developed in Section 5C following).

Portion I: [Parcels DI and D5 -- Chauncy to High Street]

It is composed of 3 segments of movement system approximately 200 feet long as indicated on drawings. Corridor access points are established according to the criteria that they occur at points providing optimum legibility and accessibility to pedestrian from the street, permit maximum uninterrupted commercial frontage potential at all levels, and encourage maximum pedestrian exposure to this frontage.

The segment crossing High Street terminates immediately at the corner of Parcel D6 when machine rooms and drive system requirements have been accommodated so as to [I] collect pedestrians from typical street access points, [2] permit transition of alignment direction in conforming to street alignment and probable grid of building, [3] optimize frontage exposure, [4] permit foot bridge connections at reasonable positions to adjacent parcels.

Bridges are of two types: those connecting to adjacent parcels across the street -- located at movement system terminal points and capable of phasing; those establishing continuity of the Corridor and carrying the movement system. These have been provided a clear pedestrian way to receive persons choosing not to use the movement system or the handicapped. Bridges are enclosed and climate controlled

Prime considerations in location of bridges have been: phasing, need to establish clear sight lines at corners and intersections for traf fic safety, optimize Corridor accessibility anc commercial viability. Extension points are es tablished in response to traffic desire lines or flow.

Chauncy Street corner conditions, constraints and variables are outlined under Section 8.

Exact position of Movement System terminals is relative to final selection of the Movement System and its particular constraints for drive shafts and service access. Positions shown ar favorable to planning needs and can approximately accommodate a 3.5 FPS accelerated system. The 6.5 system definitely requires re location of terminals to less optimal positions in order to hold longer drive systems within pr perty lines and accommodate flared exits. Th flared exit in addition affects R.O.W. width

Portion 2: [Parcels D6 and D7 -- Summer Str Connection to South Station]

Belt segment length was governed by [I] Dew Square tower configuration and position, and the pedestrian concourse R.O.W. to the Leather District, [2] direct access to the Cor ridor from the transit station, [3] pedestrian bridge potential to Dewey Square adjacent to Parcel FI.

In all cases segment terminals have been loca as close to corner Corridor access as their ma chine room and drive systems terminals permit This is necessitated by [I] need to hold the v tical elevation of the Corridor as low as possi for accessibility, and [2] location of heavy equipment, mechanical rooms, drive system, within property lines to accommodate structur loads.

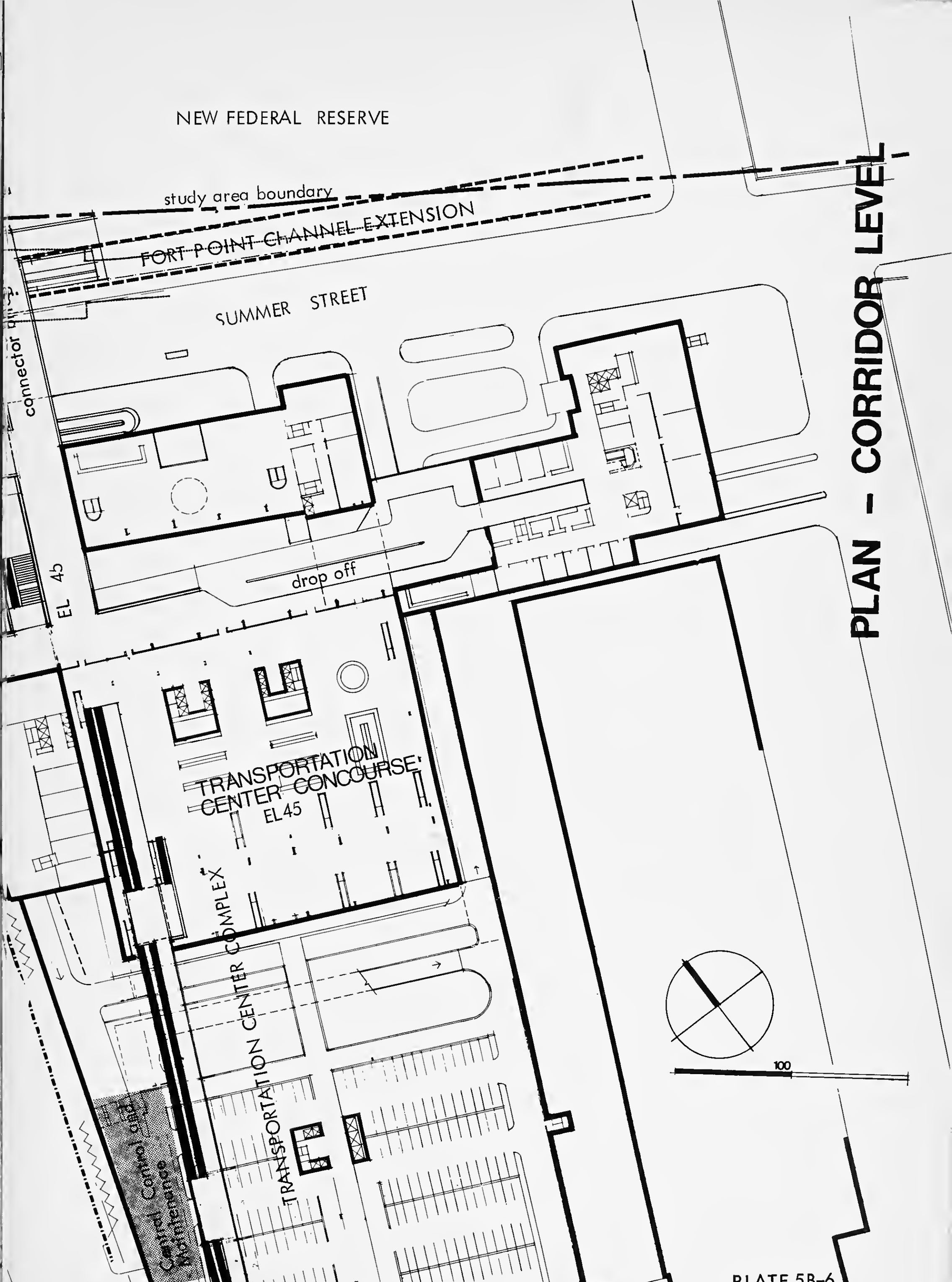

PLAN - CORRIDOR LEVEL
NEW FEDERAL RESERVE
study area boundary
FORT POINT CHANNEL EXTENSION
SUMMER STREET
connector
EL 45
drop off
TRANSPORTATION CENTER CONCOURSE
EL 45
TRANSPORTATION CENTER COMPLEX
Central Control and Maintenance
100

PLATE 5B-6

PLAN – CORRIDOR LEVEL

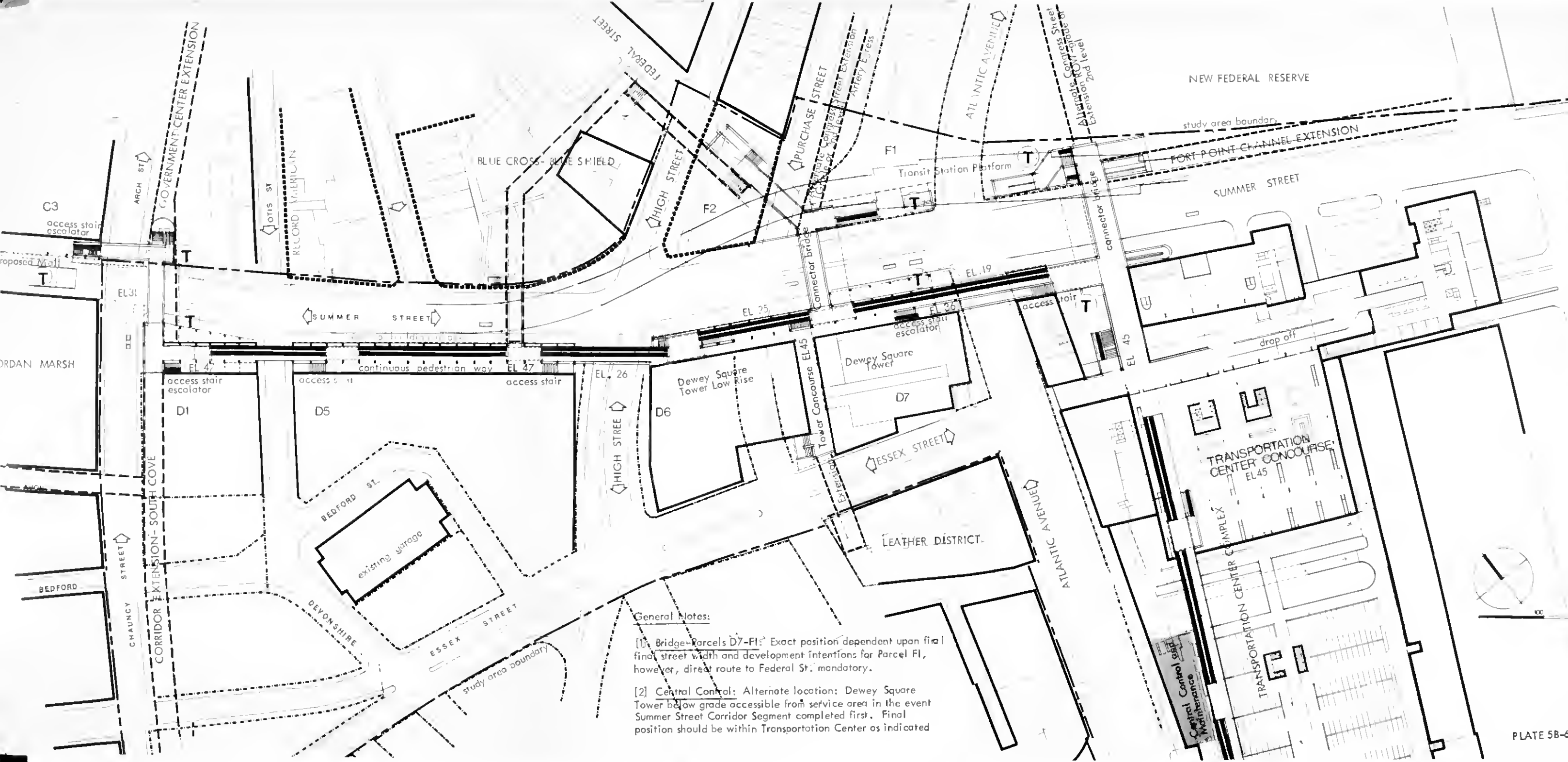


PLATE 5B-6

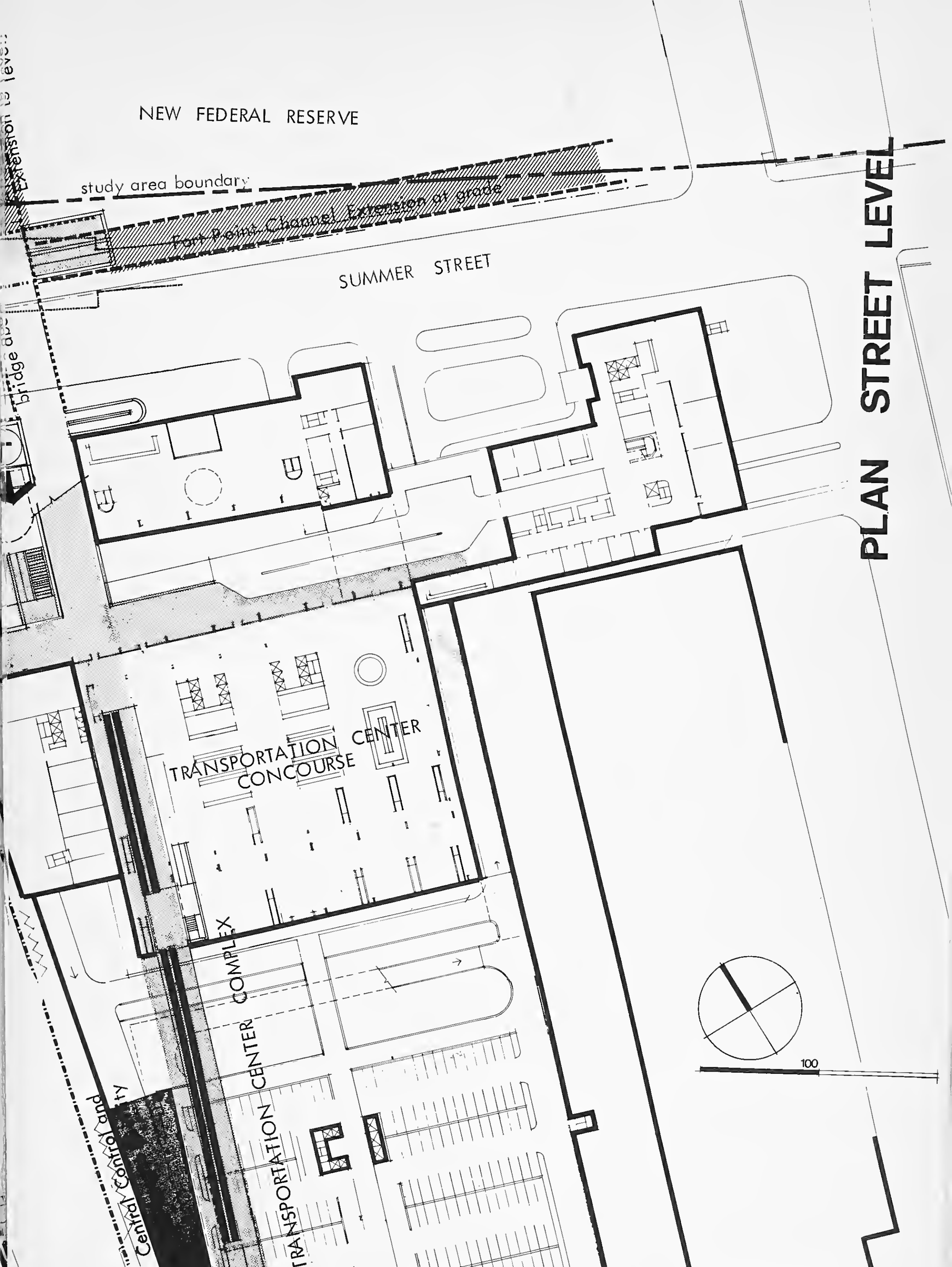
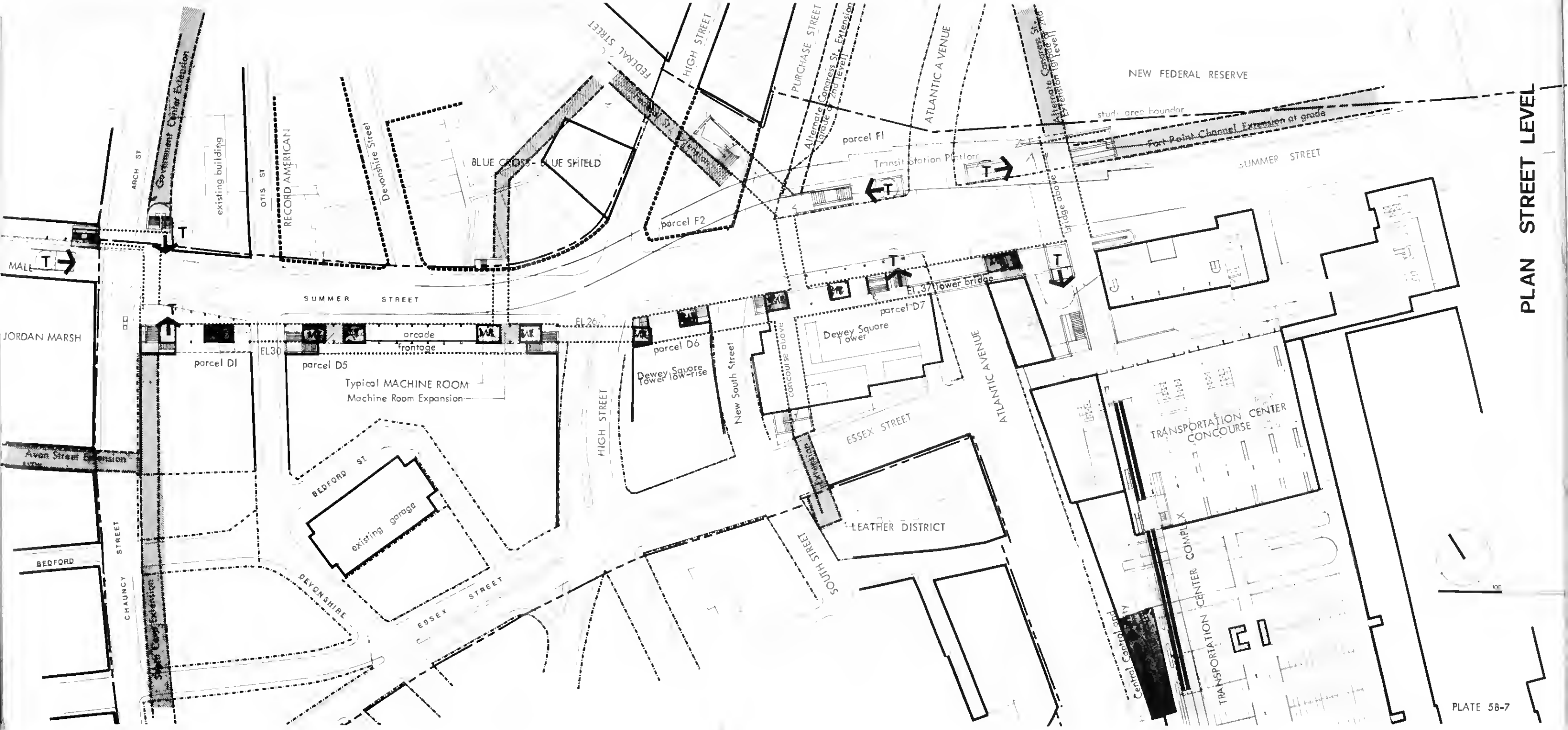
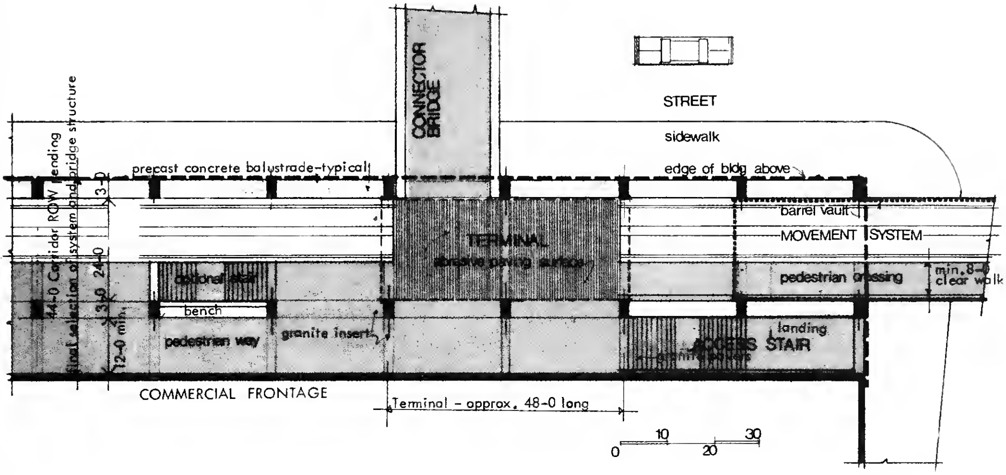

NEW FEDERAL RESERVE
study area boundary
Fort Point Channel Extension at grade
SUMMER STREET
TRANSPORTATION CENTER
CONCOURSE
TRANSPORTATION CENTER COMPLEX
Central Control
PLAN STREET LEVEL
100

PLATE 5B-7



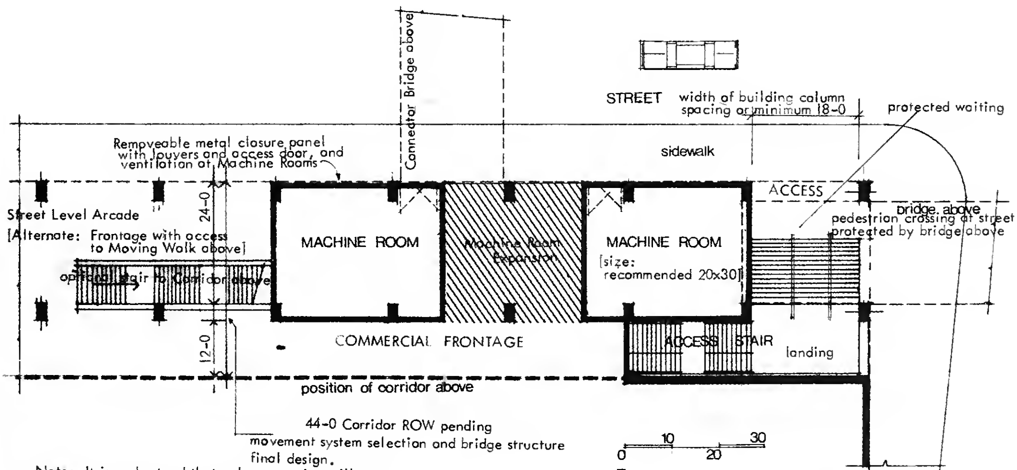
PLAN STREET LEVEL

PLATE 5B-7



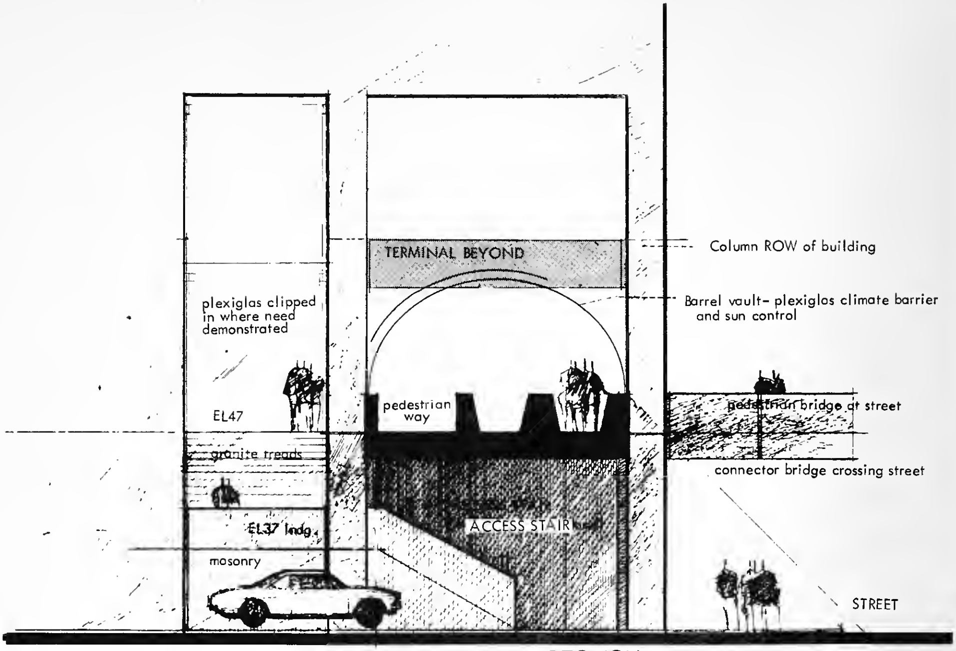
General Note: This plan describes relationships only; final positions of machine rooms, terminals, etc. is dependent upon movement system selection. Machine rooms exceeding 30-0 must be placed underground and drive system housing related to access stair headroom.
Corridor elements are subordinate to structures thru which they pass, and must be co-ordinated with their design.

PLAN-CORRIDOR LEVEL TYPICAL CORRIDOR ACCESS & MOVEMENT SYSTEM TERMINAL

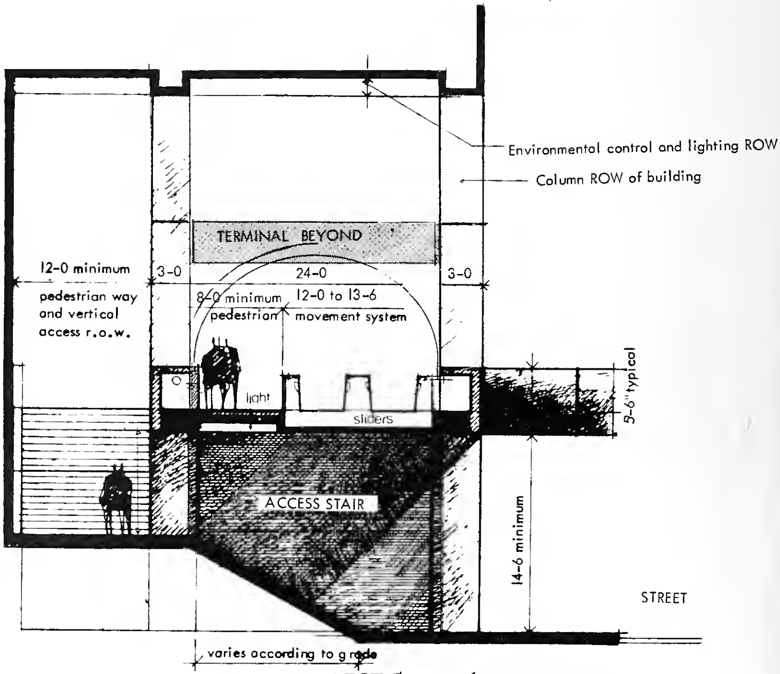


Note: It is understood that column spacing will vary according to developers proposals. Elements of the Corridor should relate if possible to actual spacing, deviating only if necessary. Receipt of bridges in clear modules, and nearness of Terminals and access stairs at corners are governing factors.

PLAN - STREET LEVEL TYPICAL CORRIDOR ACCESS MACHINE ROOM LOCATION

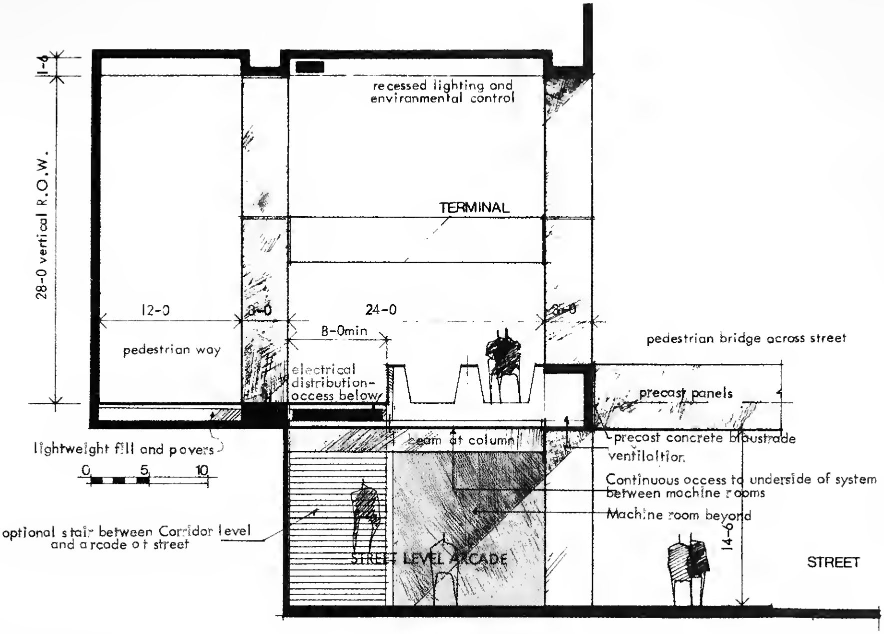


SECTION - BRIDGE AT STREET
LOOKING TOWARD CORNER ACCESS

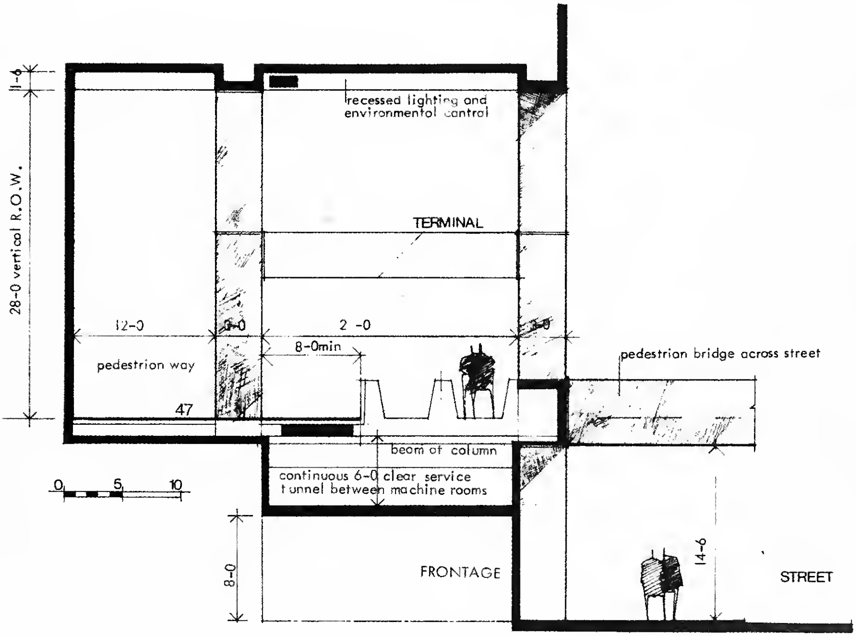


SECTION THRU BRIDGE AT
CORRIDOR ACCESS STAIR

PLATE 5B-9

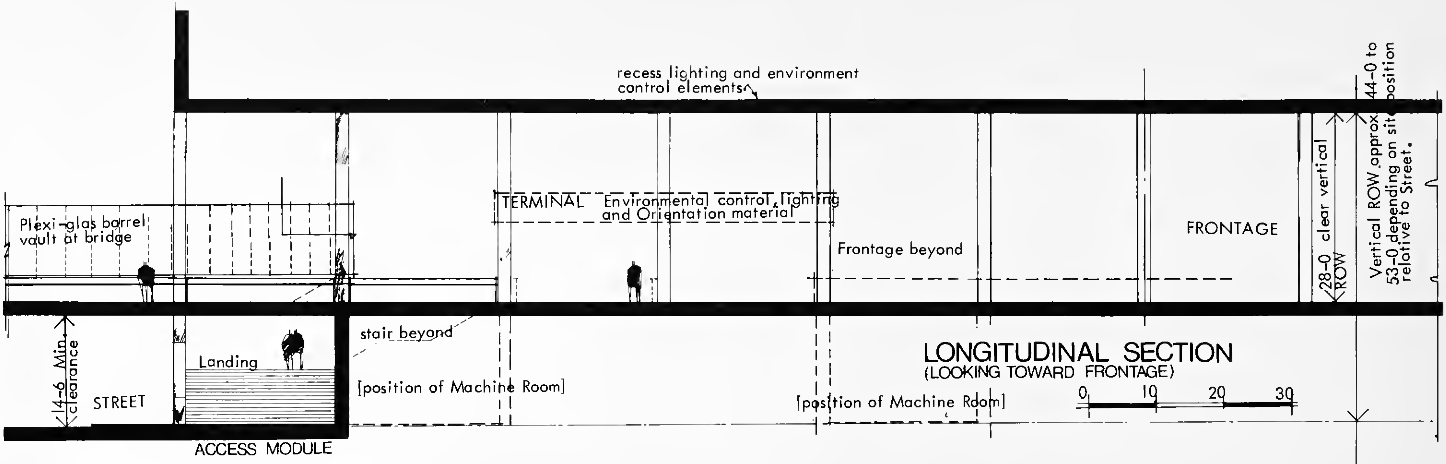


SECTION THRU TYPICAL MODULE
WITH ARCADE AT GRADE

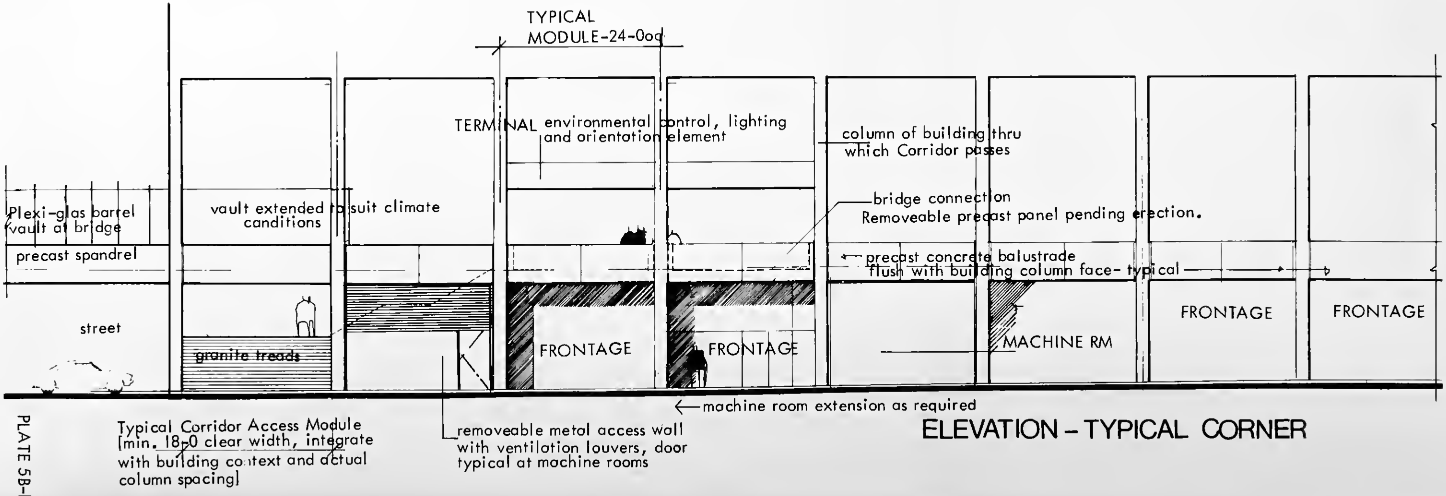


SECTION THRU TYPICAL MODULE
ALTERNATE – CONTINUOUS SERVICE TUNNEL

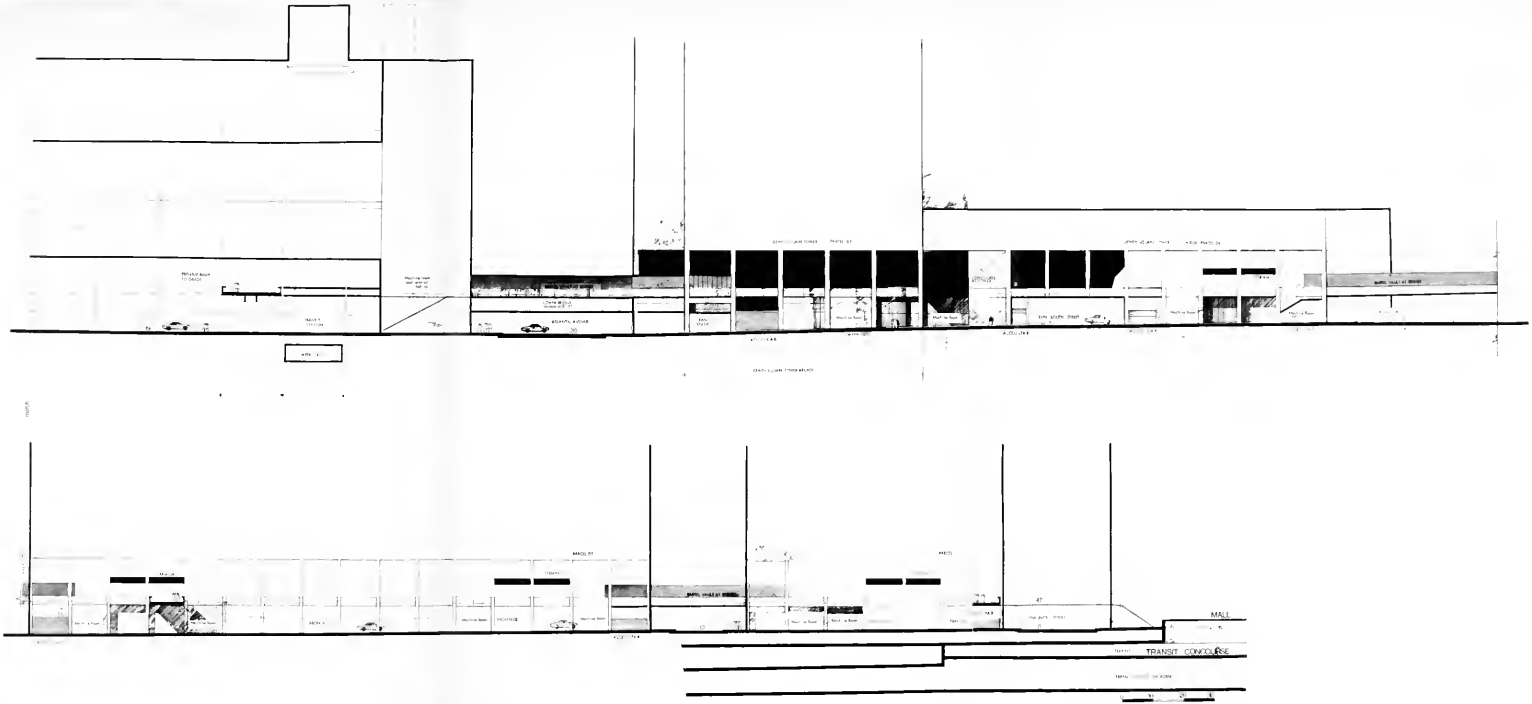
PLATE 5B-10



LONGITUDINAL SECTION
(LOOKING TOWARD FRONTAGE)

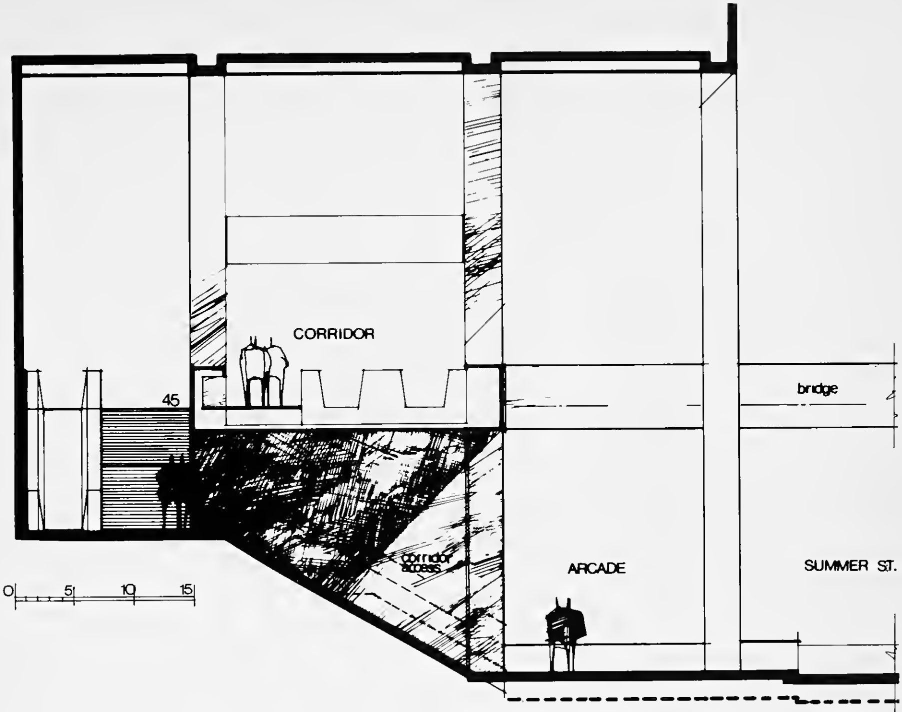


ELEVATION - TYPICAL CORNER

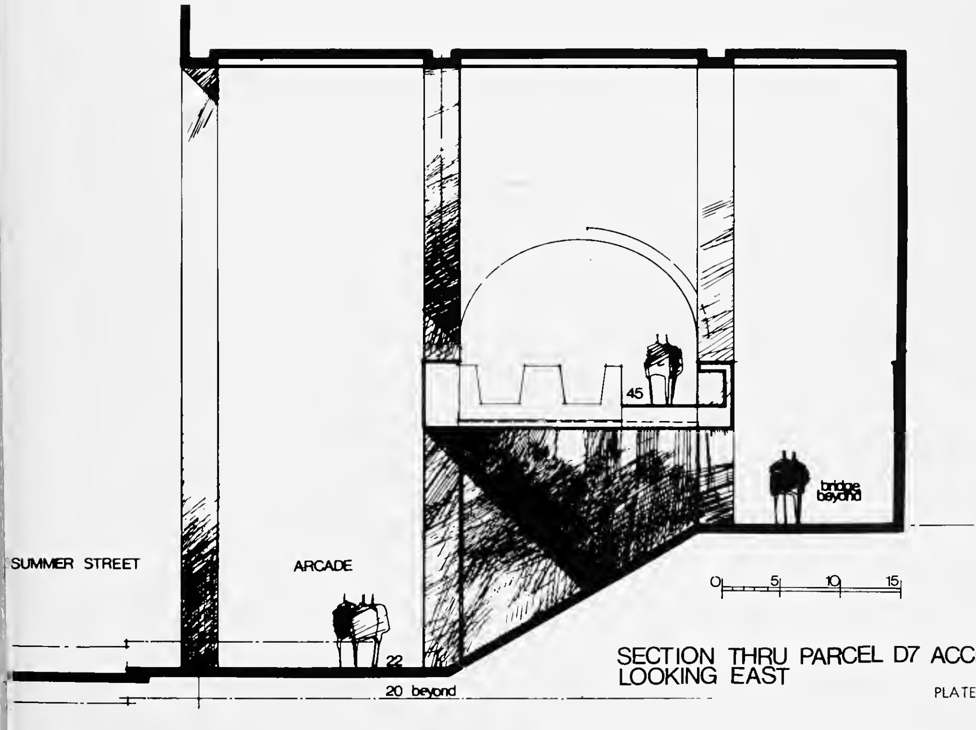


SUMMER STREET ELEVATION

PLATE 5B 12

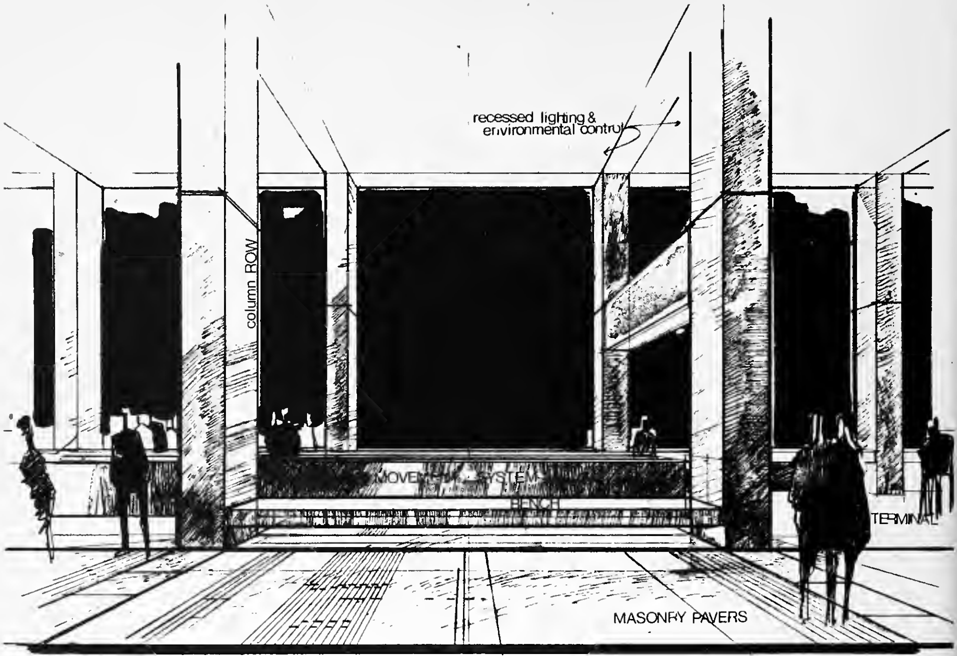


SECTION THRU PARCEL D7 ACCESS
LOOKING WEST

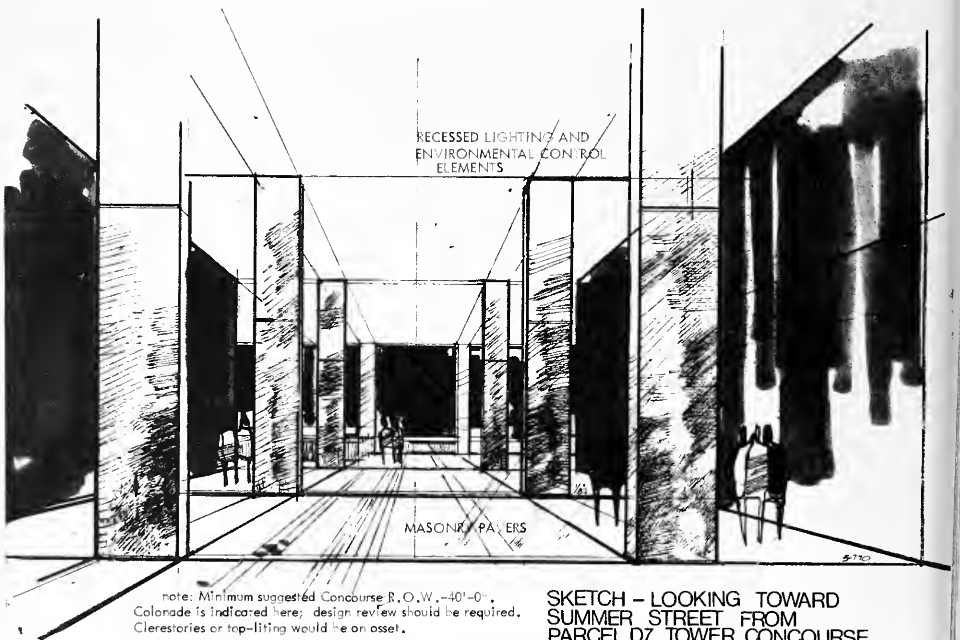


SECTION THRU PARCEL D7 ACCESS
LOOKING EAST

PLATE 5B-13

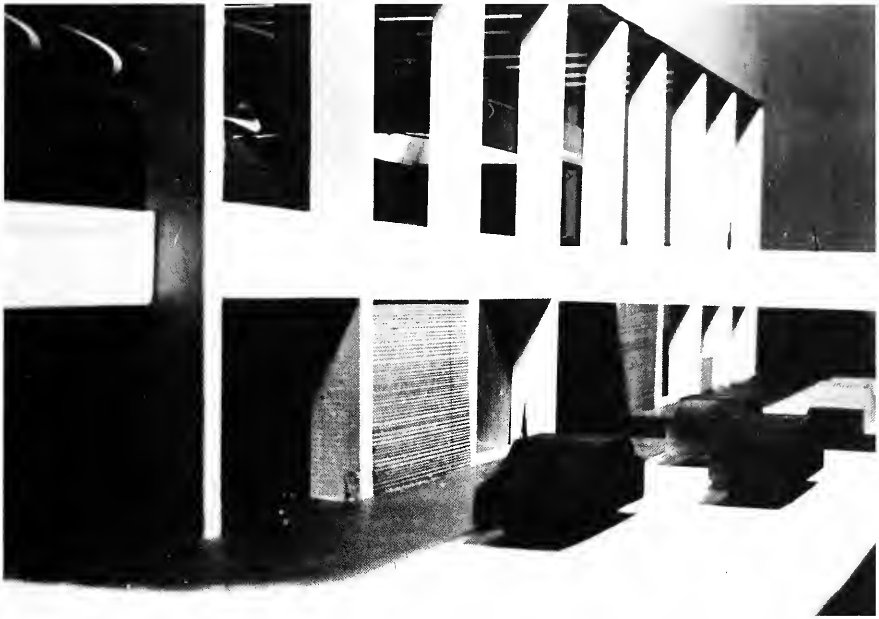


SKETCH-LOOKING FROM FRONTAGE PAST SYSTEM TO STREET



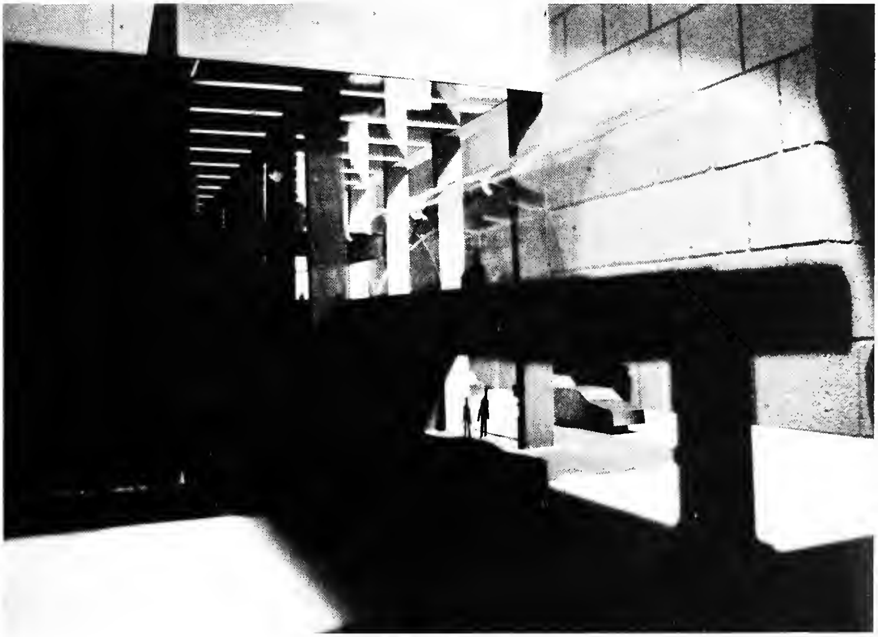
note: Minimum suggested Concourse R.O.W.-40'-0". Colonade is indicated here; design review should be required. Clerestories or top-liting would be on osset.

SKETCH - LOOKING TOWARD SUMMER STREET FROM PARCEL D7 TOWER CONCOURSE



[Top] Study Model looking toward typical Access corner with Machine Room and Connector Bridge.

[Bottom] Study Model looking toward Corridor Access Stair alongside Corridor bridge carrying pedestrian and movement system.

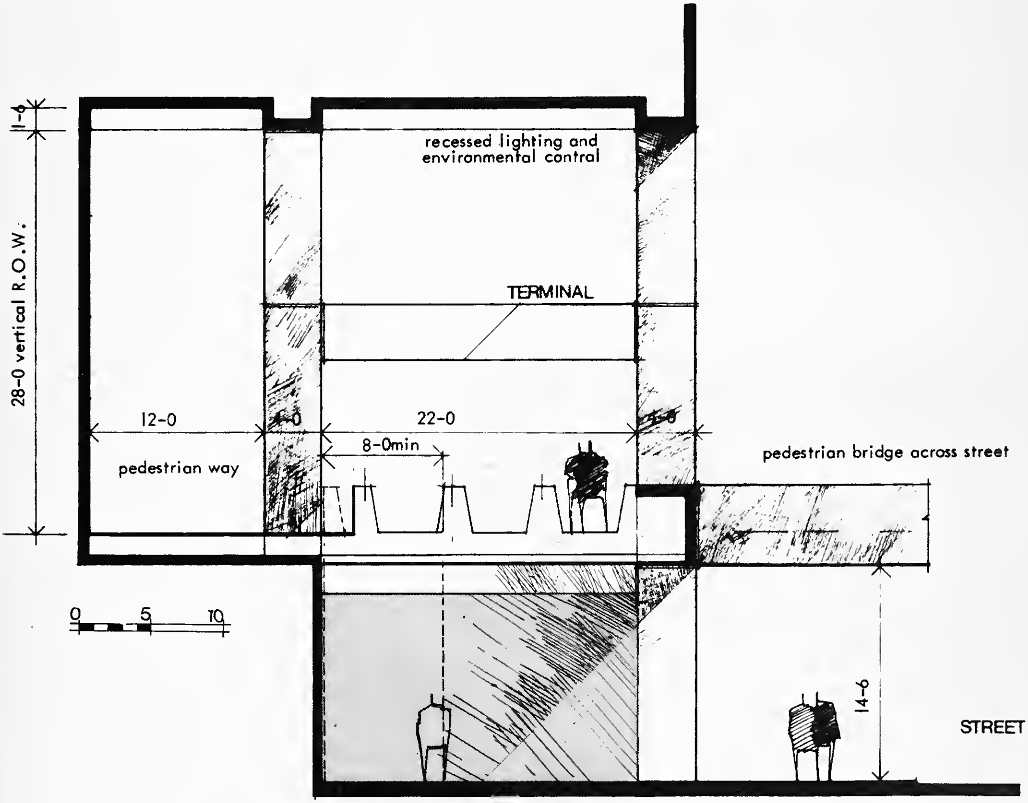


STUDY MODE

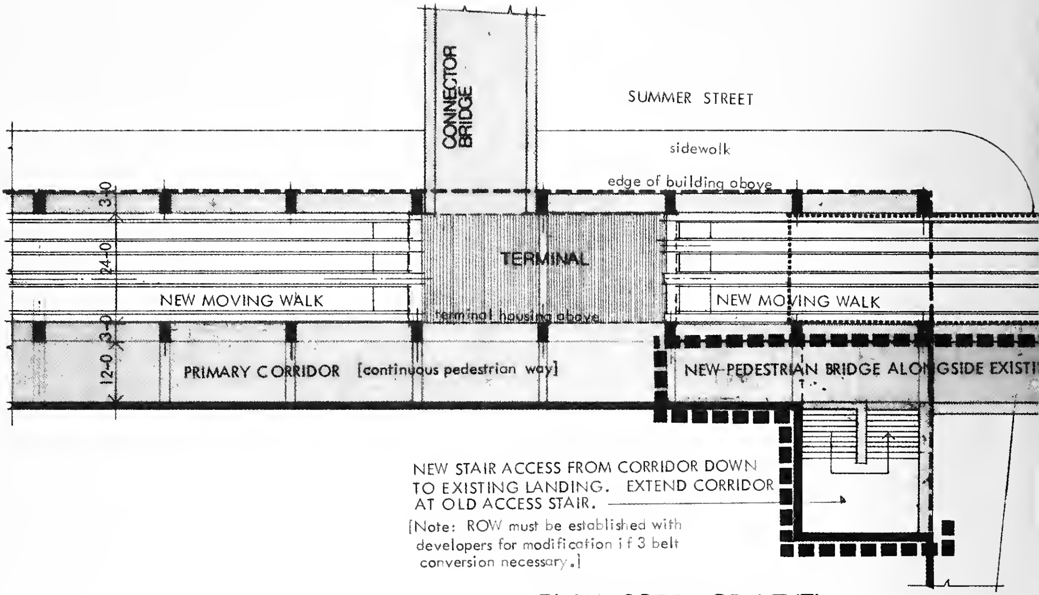
PLATE 5B-16

CORRIDOR EXPANSION:
In the event that distribution needs extend beyond Corridor capacity, an additional belt can be added alongside the original pair within the movement system R.O.W. and crossing present bridges. New bridges must be added extending the 12-0 pedestrian way at shop frontage in order to permit a continuous walkway. Corridor access stairs falling within this 12-0 way can be modified to bring users to the existing stair landing. This additional R.O.W. required for modification of the access stair, and additional load bearing capacity to receive a new bridge should be included as a part of Corridor constraints should the city wish to convert to 3 belts at some time in the future.

This consultant advises strongly against such conversion for environmental reasons, but includes the following plates (5B-17, 18, and 19) to illustrate feasibility.

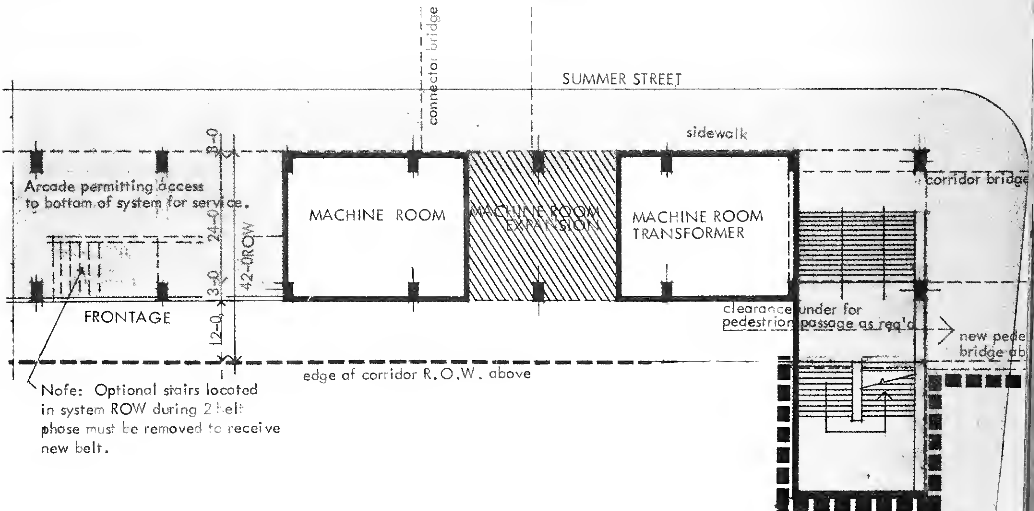


SECTION – TYPICAL MODULE
3 BELT SYSTEM CONVERSION

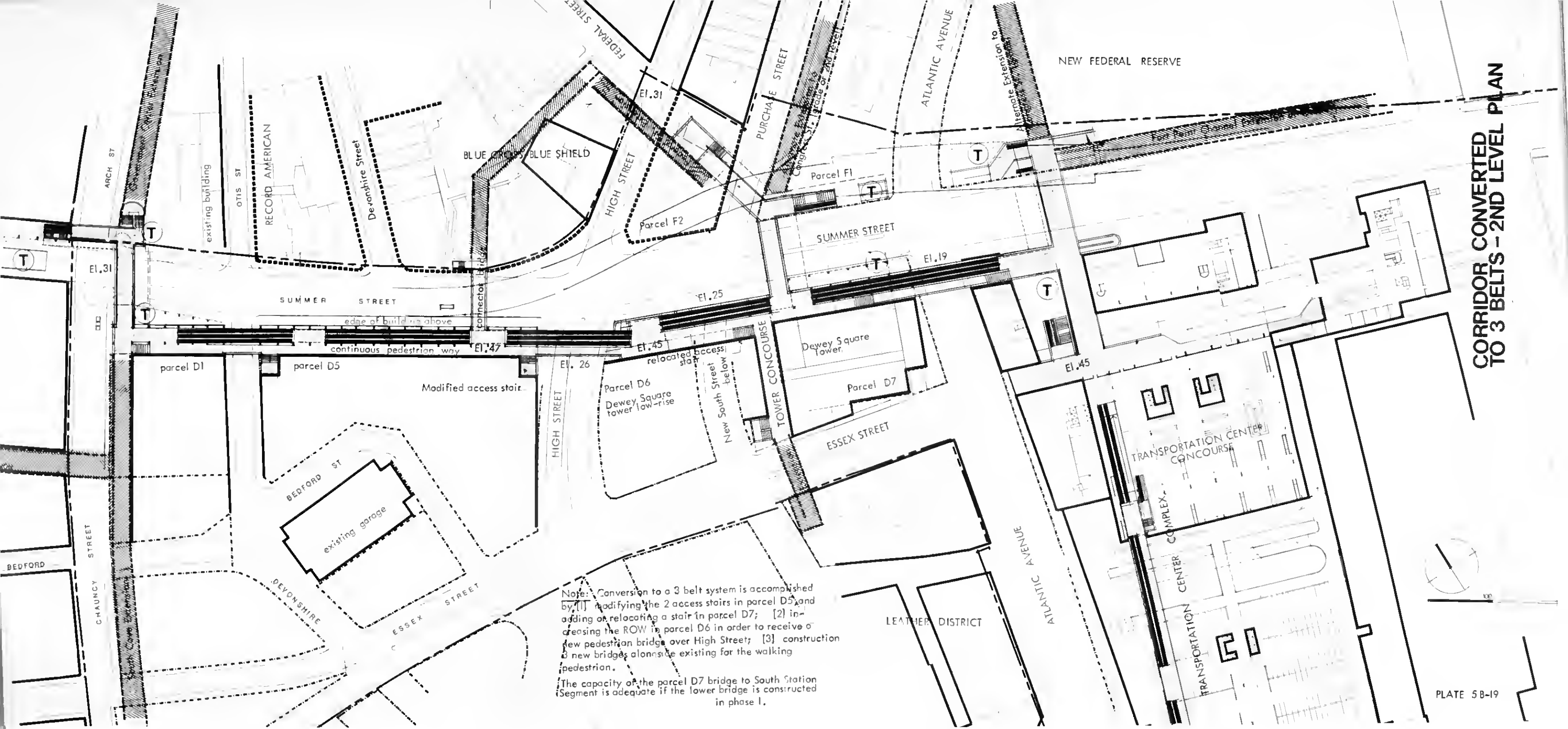


PLAN-CORRIDOR LEVEL
CORRIDOR MODIFIED TO 3 BELTS

0 10 20



PLAN - STREET LEVEL
CORRIDOR MODIFIED TO 3 BELTS



Note: Conversion to a 3 belt system is accomplished by [1] modifying the 2 access stairs in parcel D5 and adding or relocating a stair in parcel D7; [2] increasing the ROW in parcel D6 in order to receive a new pedestrian bridge over High Street; [3] construction 3 new bridges alongside existing for the walking pedestrian.

The capacity of the parcel D7 bridge to South Station Segment is adequate if the lower bridge is constructed in phase I.

CORRIDOR CONVERTED TO 3 BELTS – 2ND LEVEL PLAN

PLATE 5B-19

version for environmental reasons, as the corridor will be entirely dominated by the machinery of the moving belt, and its attractiveness as an urban place seriously reduced.

MOVEMENT SYSTEM MAINTENANCE AND SERVICE TUNNEL:

Comment: Accessibility to moving walk components by service and maintenance personnel is very important to prevent unacceptable operating outages. A continuous service tunnel with 6'-0" clear headroom throughout the length of the system cannot be achieved without raising parts of the system and corridor to a minimum of 23 feet above the street level below, clearly restricting access to the corridor, and placing additional constraints on frontage with increased access requirements. A preferred vertical alignment can be achieved of approximately 16'-6" above the street at the normal point by use of discontinuous service tunnel with use of slider instead of rollers for movement system support at bridges where clearance is important however, 3 of the 5 Summer Street segments would then be lacking access, although sliders are said not to require same, - and the system as a whole would be absorbing the additional horsepower and equipment costs to operate with sliders over their minimum run. In addition, the service tunnel where it can be provided in the parcel D5 block, would restrict clear headroom at street frontage to approximately 8'-0" below structural roof. To counter this, the final proposal places the constraint for providing service access in these areas on the parcel occupants and strongly recommends development of 'open' spaces beneath access areas, with continuous access to rollers beneath the movement system. If developers do choose to utilize this portion of the R.O.W. for enclosed space, they must assure an acceptable continuous access to system rollers.

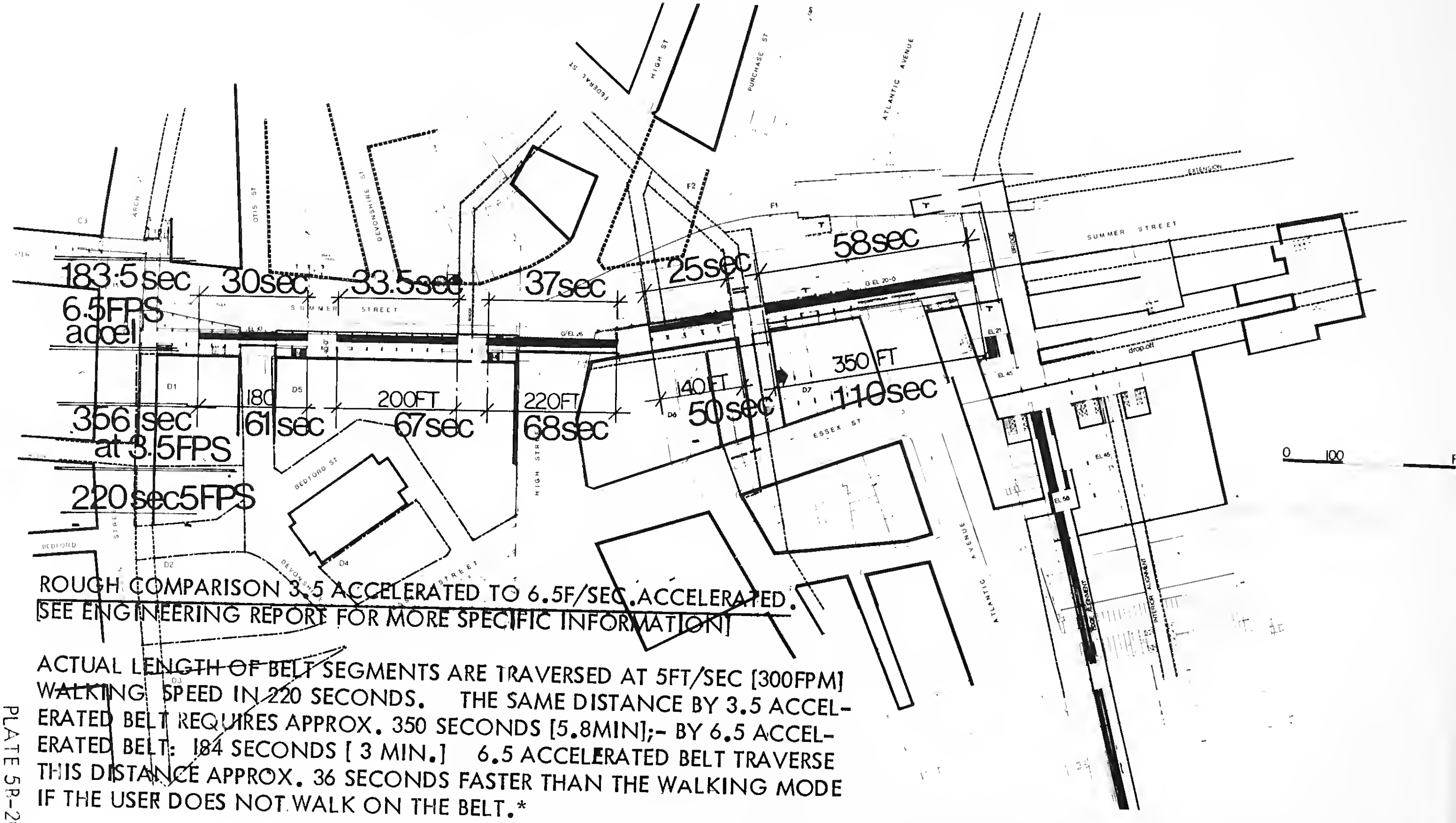
ENVIRONMENTAL:

The Corridor is clearly an environment which the movement system dominates -- even though the number of belts has been limited to 2. The walking pedestrian cannot approach the edge excepting at terminals, and these terminals themselves present areas of intense pedestrian passage and distribution, and clearly do not conform to visual - vestibular and visual-perceptual criteria. Bridges to adjacent parcels are limited to terminal points. The movement system must be designed to resist partial exposure to weather in a frontage facing winter extremes. Although comfort, heating and snow melting via infrared units should do much to protect the system Plexi-glas infill closure panels may be inserted at particular modules demonstrating special need for wind barrier after completion of the corridor.

TIME-DISTANCE COMPARISON OF 3.5 FPS WITH 6.5 FPS ACCELERATED SYSTEM: [See Plate 5B-20 opposite]:

A rough comparison is made in the plate opposite in order to approximate the time difference between the two speeds. For the length of belt segment incorporated within the phsyical reality of the corridor related to street alignment and street crossings, and terminal locations, the 6.5 FPS accelerated speed offers a possible advantage of approximately 178 seconds over the 3.5FPS system for the length of the Summer Street Segment. This is approximately 2.8 minutes faster than the 5.8 minutes total for the 3.5 FPS system, and 36 seconds faster than the walking mode.

*Note: Accelerated portions have been calculated at a mean of 1/2 the increase from 90FPM entry; for 28 ft.section–3.5 and 80 ft.section – 6.5. Figures are rough approximations only.



ROUGH COMPARISON 3.5 ACCELERATED TO 6.5F/SEC.ACCELERATED.
[SEE ENGINEERING REPORT FOR MORE SPECIFIC INFORMATION]

ACTUAL LENGTH OF BELT SEGMENTS ARE TRAVERSED AT 5FT/SEC [300FPM] WALKING SPEED IN 220 SECONDS. THE SAME DISTANCE BY 3.5 ACCELERATED BELT REQUIRES APPROX. 350 SECONDS [5.8MIN];– BY 6.5 ACCELERATED BELT: 184 SECONDS [3 MIN.] 6.5 ACCELERATED BELT TRAVERSE THIS DISTANCE APPROX. 36 SECONDS FASTER THAN THE WALKING MODE IF THE USER DOES NOT WALK ON THE BELT.*

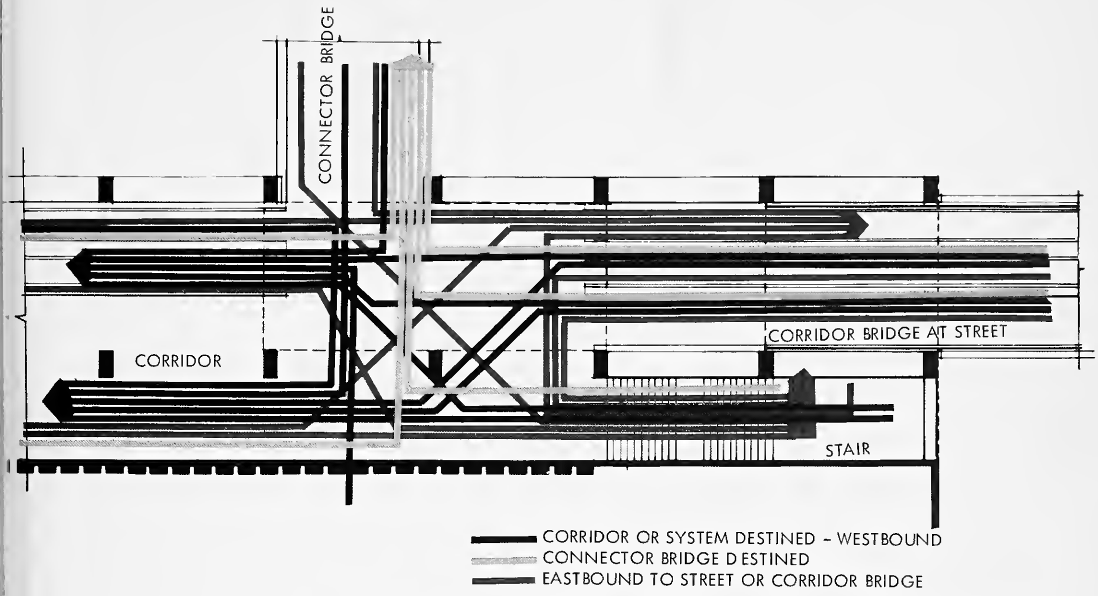
COMPARISON 3.5 & 6.5 ACCELERATED

A SERIES OF TRAFFIC FLOW OVERLAYS AND DESTINATION DIAGRAMS WERE EXAMINED TO DETERMINE COMMUNICATIONS NEEDS AT TERMINALS. EVALUATION OF THE VARIOUS FLOW POSSIBILITIES LED TO A PREFERENCE FOR MOVEMENT SYSTEM DIRECTION AND CONNECTOR BRIDGE POSITIONS, AND POINTED OUT THE PEAK HOUR QUEUE DIFFICULTIES.

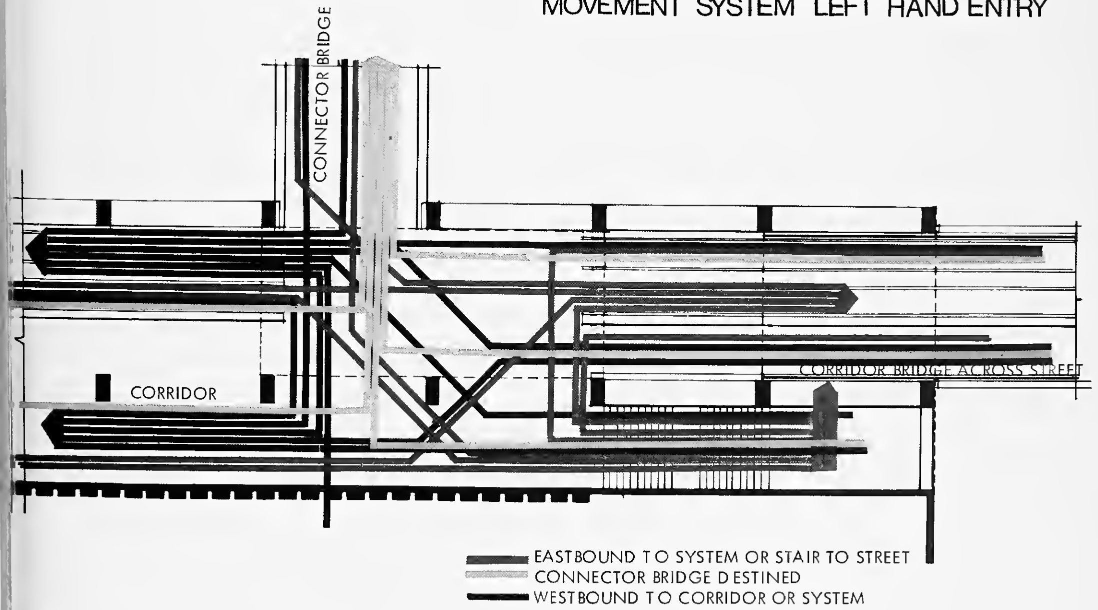
[1] Terminal traffic patterns, at best, are in conflict due to the number of variables and cross-overs of pedestrians which must take place. Terminals without connector bridges are naturally an improvement. These conflicts intensify distraction and create hazards at a point where alertness and attention are requisite to safety.

[2] "Right-handed" movement system entry, although it does not solve the cross-over conflicts affords the psychological benefit of adapting to the traffic flow habits of drivers and walkers who customarily "keep to the right". This is a persuasive reason for location of entry lanes. Corridor planning has adopted this relationship.

[3] Bridge location is preferable 'in-board' when right-handed entry is adopted [see queue diagram overlay]. This permits flow to optimize peak-hour directions, although conflicts cannot be eliminated. If possible, bridges ought to be as wide as the terminal permits, and not narrower than the 20-0 recommended.



TRAFFIC FLOW COMPOSITE
MOVEMENT SYSTEM LEFT HAND ENTRY



MOVEMENT SYSTEM TERMINAL
TRAFFIC FLOW COMPOSITE
RIGHT HAND ENTRY TO SYSTEM

LEVEL OF SERVICE STANDARDS: GENERAL

Level of service standards for walkways, stairs and queuing as established by John H. Fruin in the Doctoral dissertation "Designing for Pedestrians -- A Level of Service Concept", Polytechnic Institute of Brooklyn, Jan. 1970, have been adopted as bases for examining Corridor pedestrian capacity.

The Standards developed in this dissertation represent a considerable contribution to pedestrian planning in for the first time developing a workable tool for evaluating various walkway contexts based on density levels, implying various levels of ease of movement. This concept of ease of movement at various levels of concentration of pedestrian flow is similar to the Level of Service Standards developed by traffic engineers for vehicular flow in highway design.

Pages 5B 48-50 following, tabulate those levels applicable to the Corridor. It is recommended that final design take into consideration and reevaluate Corridor capacity based upon the more exact pedestrian volume information possible at such time.

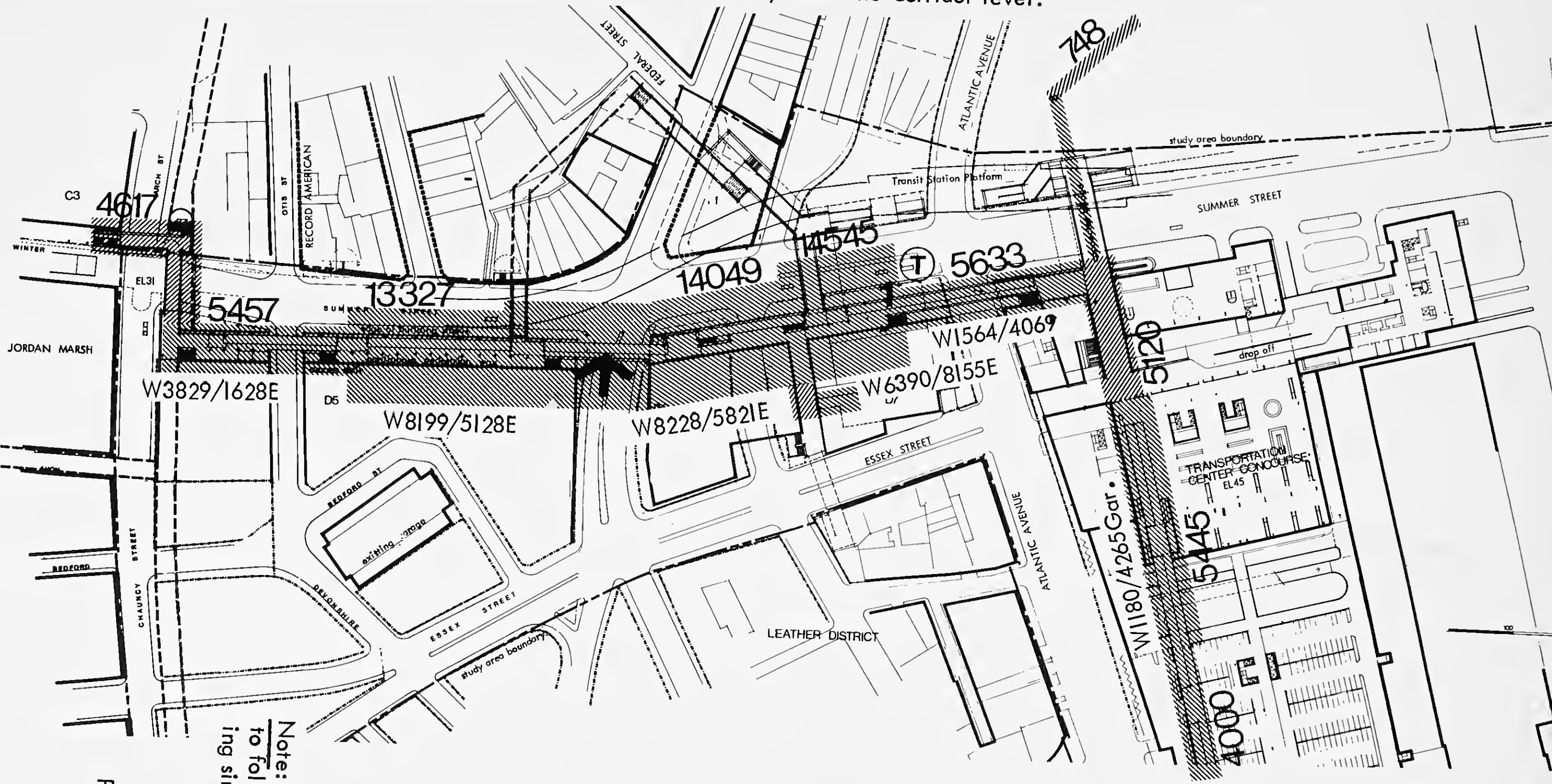
SYSTEM DOWN TIME:

General: The proposed Corridor has been examined for its ability to accommodate the pedestrian volumes anticipated by the Traffic Consultants, and to handle the crowding which may occur during a peak hour system breakdown. Pedestrian conflicts have been assumed to be a function of pedestrian spacing and need. An acceptable design standard for normal walking purposes has been established as 10 to 15 persons per minute per foot of walkway width, with a range of walking speeds between 254 and 276 feet per minute assumed 'normal'. (Level of Service Standard B) . This represents reasonably fluid flow, with friction and interaction between pedestrians in multi-directional flow situations during peak hours. Stairs should respect Level of Service C, presenting no serious conflicts with reverse flow, with an occupancy of 10-15 S.F. and volume range of 7 to 10 persons per minute per foot of walkway. Queuing requires approximately 13 or more S.F. per person to permit free circulation thru a queuing area. Terminal design permits possible free bulk queuing situations without requirements for circulation within the queue. This makes possible for distances of approximately 25 feet an average area occupancy range of 3-5 S.F. per person. Unavoidable contact between pedestrians is likely to occur between pedestrians below average area occupancies of 3 S.F. per person. Psychological experiments emphasizing human comfort prefer buffer zones of 4 to 9 S.F. per person. Limited internal circulation only is possible at this range. Queuing Level of Service Standard D (no touch) at 3 to 7 S.F. with an average interperson spacing of 2 to 3 feet is recommended as in peak hour standard. This should permit roughly 10 to 12 persons queuing for entry assuming belt entry to receive persons at 75% use or 3750 per hour. (5000 per hour has been suggested continuous capacity). Approximately 60 persons per minute should be entering the system then from the backup queue.

Corridor walkways and bridges: The Corridor as a whole will accept anticipated volumes very well, with the possible exception of the bridge over High Street. This connection will handle normal volumes and movement system down-time in the peak direction, but will not accommodate flow during total system down time unless persons also walk on belts. Flow will reach emergency proportions where movement will be highly restricted. It is expected that the access stairs at either end of this bridge and the connector bridge across Summer Street will relieve this pressure, providing an alternative route. If possible, this Bridge should be widened in final design when

ing the Transit on the North side of Summer Street. The indicates a congested area if both belts break down. People will be forced to enter the street via stair to continue direction of travel.

level directly at grade to that Transit [point I] considerably relieving Corridor of volume. Volume overlay is for both levels of Summer Street, although it is expected that these persons will largely be at the Corridor level.



Note: PLATES 5B-23 & 24 to follow in final printing similar.

PEDESTRIAN VOLUME
[TRAFFIC ASSIGNMENT A-I]

PLATE 5 B-22

developers on each side of the street are certain. Generous access stairs should definitely be maintained at either end of the bridge (as is the rule for the entire Corridor).

Such entire systems down-time during a peak hour should be unusual. Since a change of bridge site here exerts a decided increase in R.O.W. depth at parcel D6. It is unclear that the volume would ever actually exist as alternate routings exist for the Federal Street volume.

A forecourt or concourse connection at the Dewey Square Tower entry should be provided to collect a 5000 person volume to respond to system down-time. Direct access to the Tower should also take place from this point.

LEVEL OF SERVICE STANDARDS FOR WALKWAYS:

(1) Level of Service A: Equivalent to an average pedestrian area occupancy of 35 S.F. per person or greater. Sufficient area is provided for speed, to bypass slower pedestrians, and to ovoid crossing conflicts with others. Design volumes are approximately 7 persons per minute per foot of walkway or less.

(2) Level of Service B: Equivalent to an average pedestrian area occupancy in the range of 25-35 S.F. per person. Sufficient space is available to select normal walking speed and bypass other pedestrians in primarily uni-directional flows. Where reverse direction or pedestrian crossing movements exist, minor conflicts will occur, slightly lowering mean pedestrian speeds and potential volumes. Design volumes are in the range of 7 to 10 persons per minute per foot width of walkway.

(3) Level of Service C: Equivalent to an average pedestrian area occupancy of 15 to 25 S.F. per person. Freedom to select individual walking speeds and freely pass other pedestrians is restricted. Where pedestrian cross movements and reverse flows exist, there is a high probability of conflicts requiring frequent adjustments of speed and direction to avoid contact. Design volumes are in the range of 10 to 15 persons per minute per foot of walkway width. Designs to this level of service represent reasonably fluid flow, however considerable friction and interaction between pedestrians is likely to occur, particularly in multi-directional flow situations.

(4) Level of Service D: Equivalent to an average area occupancy in the range of 10 to 15 S.F. per person. At this level of service, the majority of persons would have their normal walking speeds restricted and reduced due to difficulties in bypassing slower moving pedestrians and avoiding conflicts. Pedestrians involved in reverse flow and crossing movements would be severely restricted, with the occurrence of multiple conflicts with others. Design volumes would be in the range of 15 to 20 persons per minute per foot of walkway width. Designs at this level of service would be representative of the most crowded public areas where it is necessary to continually alter walking stride and direction to maintain reasonable forward progress. At this level of service there is some probability of intermittently reaching critical density, causing momentary stoppages of flow. Designs consistent with the level of service would represent only the most crowded public areas.

(5) Level of Service E: Equivalent to an average pedestrian area occupancy in the range of 5 to 10 S.F. per person. At this level of service virtually all pedestrions would have their normal walking speeds restricted requiring frequent adjustments of gait. At the lower end of the range, forward progress would only be made by shuffling. Ex-

treme difficulties would be experienced by pedestrians attempting reverse flow and cross flow movements. The design volume in the range of 20 to 25 persons per minute per foot of walkway width, would approach the maximum attainable capacity of the walkway, with the result of frequent stoppages and interruptions of flow. Design in this range should only be employed for short peaks, in the most crowded pattern that immediately exceeds available capacity and this is the only design situation for which it would be recommended. Examples would include sports stadium design, or transit facilities where there is an uncontrolled short term exodus of pedestrians. When this level of service is assumed for these design conditions, the adequacy of pedestrian holding areas at the approaches to critical design sections must be evaluated.

(6) Level of Service F: Equivalent to an average pedestrian area occupancy of 5 S.F. or less. At this level of service all pedestrian walking speeds are extremely restricted and forward progress can only be made by shuffling. There would be frequent unavoidable contacts with other pedestrians and reverse or crossing movements would be virtually impossible. Traffic flow would be sporadic with forward progress based on movement of those in front. This level of service is representative of a loss of control and a complete breakdown in traffic flow. Pedestrian areas below 5 S.F. are representative of a queuing rather than traffic flow situation, and are not recommended for walkway design.

LEVEL OF SERVICE STANDARDS FOR STAIRWAYS:

(1) Level of Service B: Equivalent to an average pedestrian area occupancy of 20 or more S.F. and a volume of approximately 5 to 7 persons per minute per foot of stairway width. Virtually all persons may select stair locomotion speeds. However, in the low range of area occupancy, some difficulties would be experienced in passing slower moving pedestrians. Reverse flows would present no serious traffic conflict.

(2) Level of Service C: Equivalent to an average pedestrian area occupancy of between 10 and 15 S.F. and a volume of 7 to 10 persons per minute per foot of stairway width. All persons may freely select stair locomotion speeds. However, stair locomotion speed would be restricted slightly due to inability to pass slower moving pedestrians. No serious conflicts would be encountered with reverse flows.

(3) Level of Service D: Equivalent to an average pedestrian area occupancy of 4 to 7 S.F. and a volume of 13 to 17 persons per minute per foot of stairway width. At this level of service, virtually all persons would have their normal stair locomotion speeds reduced because of the minimum tread length space and inability to bypass others. Intermittent stoppages are likely to occur as the critical pedestrian density is reached. Reverse flows would experience serious conflicts. This level of service would only occur naturally with a bulk arrival traffic pattern that immediately exceeds available capacity and this is the only design situation for which it would be recommended. Examples would include sports stadiums or transit facilities where there is an uncontrolled short term exodus of pedestrians.

(5) Level of Service F: Equivalent to an average pedestrian area occupancy of 4 S.F. or less. This area occupancy is representative of a complete breakdown in traffic flow, with many stoppages. Forward progress would depend on movement of those in front. This design level of area occupancy is not recommended.

LEVEL OF SERVICE STANDARDS FOR QUEUING:

(1) Level of Service A -- (Free Circulation Zone): Equivalent to a minimum average area per person of 13 S.F. and average inter-person spacing of four feet or more. At this level of service, adequate area is provided for standing and free circulation through the queuing area without disturbing others. Applications would include better designed passenger concourse areas and baggage claim areas.

(2) Level of Service B -- (Initial Circulation Zone): Equivalent to an average area per person in the range of 10 to 13 S.F. and an average inter-person spacing of 3 1/2 to 4 feet. At this level of service, adequate area is provided for standing and restricted circulation through the queue without disturbing others. Applications would include railroad platforms and passenger concourse areas.

(3) Level of Service C -- (Personal comfort Zone): Equivalent to an average area per person in the range of 7 to 10 S.F. and an average inter-person spacing of 3 to 3 1/2 feet. At this level of service, adequate area is provided for standing and restricted circulation through the queuing area by disturbing others. Within the range of the personal comfort body buffer zone established by psychological experiments. Applications would include ordered queue ticket selling areas and elevator lobbies.

(4) Level of Service D -- (No Touch Zone): Equivalent to an average area per person in the range of 3 to 7 S.F., and an average inter-person spacing of 2 to 3 feet. At this level of service adequate area is provided for standing without personal contact with others, but circulation through the queuing area is severely restricted, and forward movement is only possible as a group. Applications would include motorstair queuing areas, pedestrian safety islands, or holding areas at crosswalks. Based on psychological experiments, this level of area occupancy is not recommended for long term periods of queuing.

(5) Level of Service E -- (Touch Zone): Equivalent to an area per person in the range of 2 to 3 S.F. and an average inter-person spacing of 2 feet or less. At this level of service adequate space is provided for standing, but personal contact with others is unavoidable. Circulation within the queuing area is not possible. This level of area occupancy can only be sustained for short periods of time without physical and psychological discomfort. The only recommended application would be elevators.

(6) Level of Service F --(The Body Ellipse): Equivalent to an area per person of 1 1/2 to 2 S.F., or the approximate area of the human body with heavy clothing. Standing is possible but close unavoidable contact with surrounding standees causes physical and psychological discomfort. No movement is possible, and the potential for panic exists in large crowds.

Section 5C

SUMMER STREET CORRIDOR
SPECIFIC DESIGN DEVELOPMENT

Table of Contents:

CORRIDOR DESIGN DEVELOPMENT:

CORRIDOR DESIGN DEVELOPMENT ADOPTED A 'SYSTEMS' APPROACH -- REGARDING THE PEDESTRIAN WAY AS A COLLECTION OF SPECIFIC COMPONENTS OR MODULAR ELEMENTS WHICH WERE REPEATED IN SEQUENCES AS NECESSARY. THIS APPROACH WAS NECESSARY IN ORDER TO PERMIT PLANNING TO PROCEED IN LIGHT OF THE VARIABLES SUSTAINED DURING THE STUDY, -e.g. ALIGNMENT ALTERNATES (VERTICAL AND HORIZONTAL), THE NEW CONSTRUCTION CONTEXT, PHASING CONSTRAINTS OVER A PERIOD OF TIME, IMPLEMENTATION SEQUENCES, AND MOVEMENT SYSTEM ALTERNATES. IT IN ADDITION WAS FOUND TO BE VERY APPROPRIATE AND SYMPATHETIC TO THE DISTRIBUTION FUNCTION OF THE CORRIDOR AS PLANNING PROCEEDED.

Structure: Structural support of equipment and floor surfaces, bridges and balustrades, are as extensively as possible to be provided by the context of the structures through which the pedestrian corridor passes. The approach is to provide information about anticipated loads expected for the different components or elements of the system (typical module, bridges, machine rooms, etc.) sufficient to predesign this load into the surrounding building support systems and footings, providing connection points to receive the corridor. It is suggested that actual construction of the pedestrian corridor coincide with that of the various development parcels, -each parcel completing the corridor within its envelope, with exception of installation of the movement system, weather closure and orientation devices.

IN ORDER TO IMPLEMENT DESIGN DEVELOPMENT, THE CORRIDOR HAS BEEN DELINEATED AS A SERIES OF COMPONENTS OR 'MODULE' ELEMENTS OF DIFFERING PURPOSE:

[I] TYPICAL CORRIDOR MODULE: A 'slice' through the pedestrian Corridor R.O.W. at a point along the movement system route;

[2] TYPICAL CORRIDOR ACCESS ELEMENT: A standardized or typical stair element leading from street to the pedestrian Corridor above;

[3] REMOTE ACCESS STAIR: A typical stair element serving connector bridges to the Corridor;

[4] MOVEMENT SYSTEM ACCESS TERMINAL: Prototypical terminal areas for movement system access-egress;

[5] CORRIDOR BRIDGES: Bridges connecting the Corridor, including the movement syster and a barrel vault closure for weather protectio

[6] CONNECTOR BRIDGES: Typical connector bridge to adjacent parcels, carrying pedestrians only, and provided with lighting and snow melting only.

USE OF THE MODULE PERMITS ESTABLISHING A COST, AND ALSO IDENTIFIES A RANGE C CONSTRAINTS OR CONSIDERATIONS WHICH PERMITTED PLANNING WITHIN PRESENT VARIABLES.

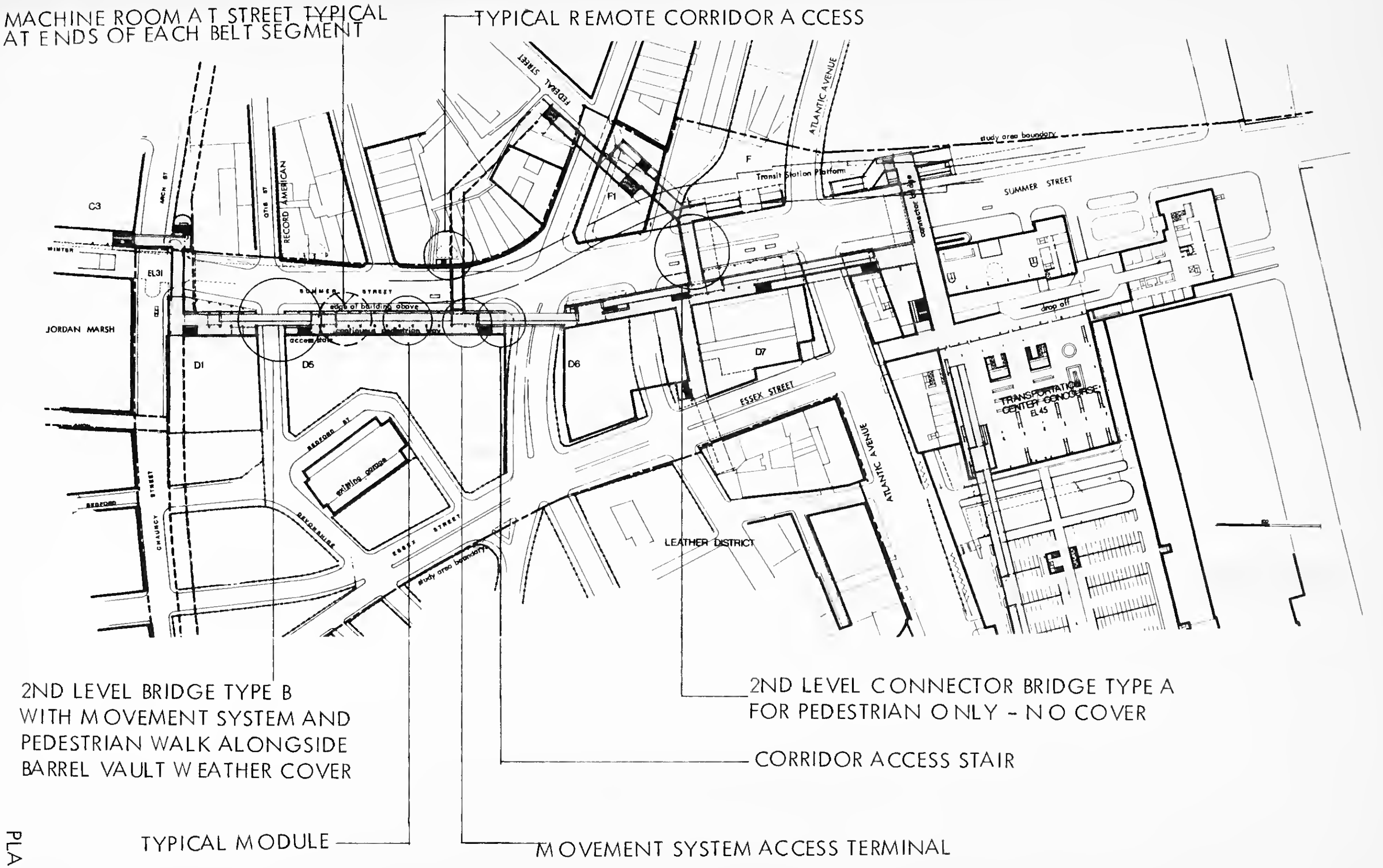


PLATE 5C-I

TYPICAL MODULES

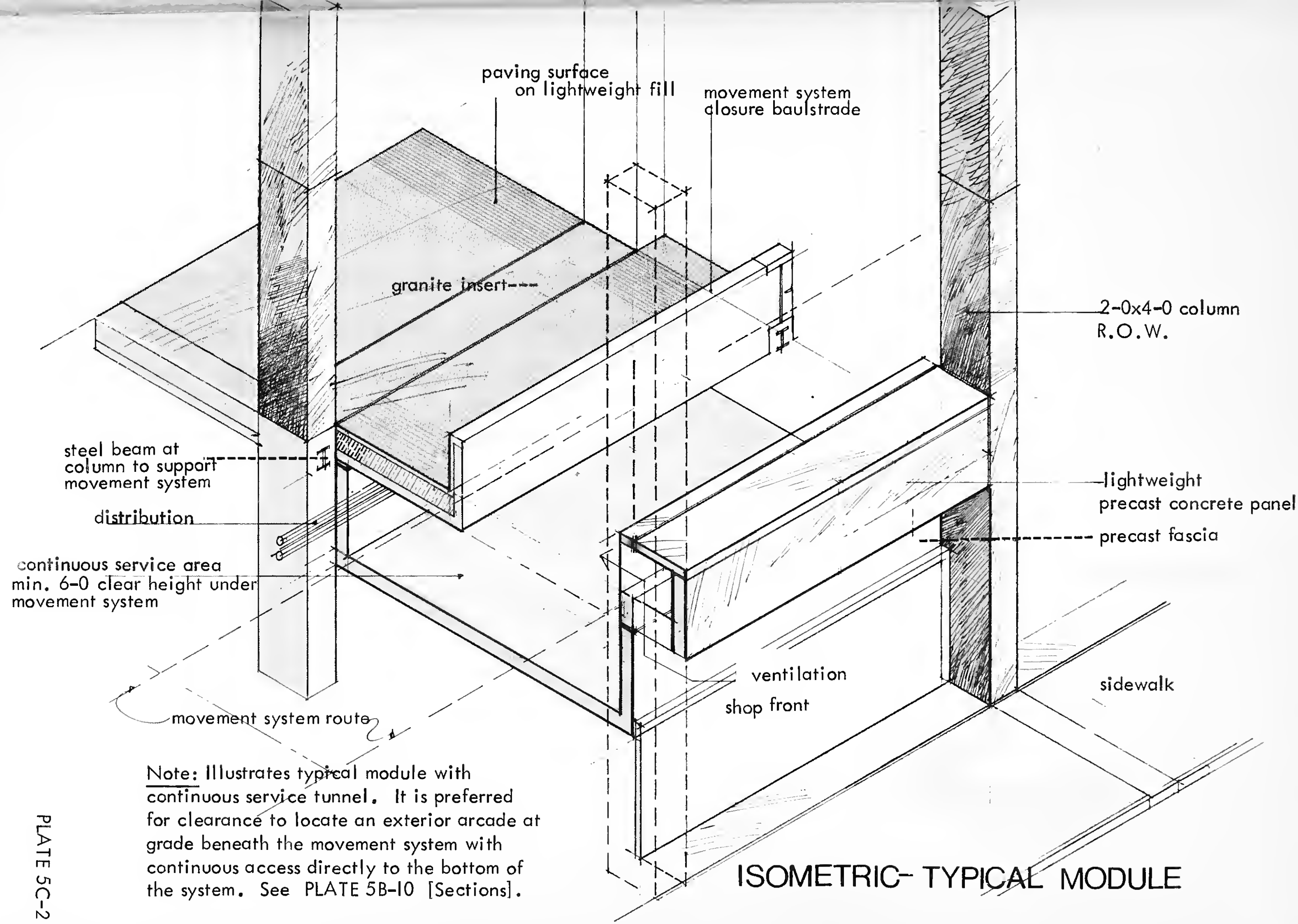
TYPICAL CORRIDOR MODULE:

The typical Corridor module is a 'slice' thru the pedestrian Corridor R.O.W. at any point along the movement system route. (See Plate 5C-2 opposite). Module dimensions are assumed as 24-0 wide by the R.O.W. depth of 42-0. 24-0 was selected for study purposes as a likely column spacing of the structures thru which the Corridor would pass. Although this spacing will certainly vary, the module provides a convenient unit of measurement, cost and service.

The movement system clear R.O.W. is presently established as 24-0 clear. This R.O.W. must describe a straight line. 24-0 permits receipt of bridges, a 13-6 movement system width (two 44"belts) plus a clear pedestrian passage of 8-0 minimum crossing at bridges, and affords sufficient width for addition of a future belt. Final design of both bridge structure and movement system selection are required to reduce this R.O.W. depth.

3-0 column R.O.W.s are allowed on either side of the movement system R.O.W. in addition to a clear 12-0 pedestrian way alongside frontage. Column width may be increased, but should project to either side of the R.O.W., maintaining the movement system R.O.W. in its exact same position relative to adjacent parcels and bridges. A 15-0 sidewalk width is indicated, in which any additional column width could be accommodated as approved by the City.

The structural floor should be provided as part of the building context, and a removeable precast spanning member incorporated alongside the initial 2 belt segment to permit expansion. In the event the building context is completed prior scheduling of movement system installation, temporary precast closure panels and paving should be installed in the system route. All surrounding finishes and balustrades, lighting, etc. should be completed with completion of the actual surroundings. Paving, snowmelting, and recessed environmental control and lighting are the responsibility of the City. Continuous access must be provided to the underside of the movement system for service.



Note: Illustrates typical module with continuous service tunnel. It is preferred for clearance to locate an exterior arcade at grade beneath the movement system with continuous access directly to the bottom of the system. See PLATE 5B-10 [Sections].

ISOMETRIC– TYPICAL MODULE

PLATE 5C-2

CRITERIA: PEDESTRIAN CORRIDOR ACCESS POINT DESIGN DEVELOPMENT HAS RECOGNIZED THESE CONCERNS:

Legibility: Ease of recognition-identification and accessibility to the user, either on the street or in the Corridor;

Mode: Stairs and/or escalators as required.

Safety and Surveillance: Optimum sense of security to user, -low rise, materials affording good footing, adequate lighting;

Maintenance: Designed simply without recesses or corners collecting dirt, or materials which appear 'clean' and are readily maintained;

Materials: Durable and readily maintained, colour should establish continuity between pedestrian levels but primarily be understood as a downward extension of the upper level;

Graphics and Orientation: Access elements as planned should not require graphics or orientation devices because of their clear locations on corners. However, should it be advisable, the machine room wall and/or landing wall is suggested as appropriate location. The question should be examined by the graphics consultant;

Lighting and Environmental: Lighting for safety, continuity with corridor above, attention, and comfort heating and snow melting at landing treads.

Waiting: Small protected waiting area should be provided.

Permanence: Although the module itself can be relocated prototypically in a number of places, its materials and treatment should be regarded as 'permanent'.

PLATE 5C-3

PEDESTRIAN VOLUME: AT THIS TIME, NO SPECIFIC INFORMATION ON PEDESTRIAN VOLUMES AT PROPOSED ACCESS POINTS IS AVAILABLE SO AS TO TEST OR ESTABLISH CRITICAL SIZES AND DIMENSIONS FOR ACCESS ELEMENTS.

PLANNING HAS PROCEEDED ON CAPACITY ASSUMPTIONS, HAS ADMITTED CODE REQUIREMENTS TO ACCOMMODATE THE HANDICAPPED, AND NORMAL SAFETY REQUIREMENTS, AND APPEARS REASONABLE. THE SYSTEM IS FLEXIBLE AND CAN ADMIT CHANGE OR ADDITION IF AN UNUSUAL NEED DEVELOPS.

CORRIDOR ACCESS ELEMENT:

Description: Design development has yielded a 'prototypical' corner stair element which can accommodate an escalator, be recognized readily from all directions by the pedestrian as access, permit integration within the building context within which it is found. The element is to be defined by column spacing of the particular building within which it is found so as to ensure uniformity of identity and form, but developed so that it is not dependent upon this context but understood as an extension of the lower street level establishing continuity with the pedestrian surface of the corridor above.

Landing elevation is dictated by (1) length of run and ability of the particular site location to accommodate this run, (2) minimum 8'-0" headroom clearance under 2nd level, and (3) actual ground elevation established by location of module along the corridor route.

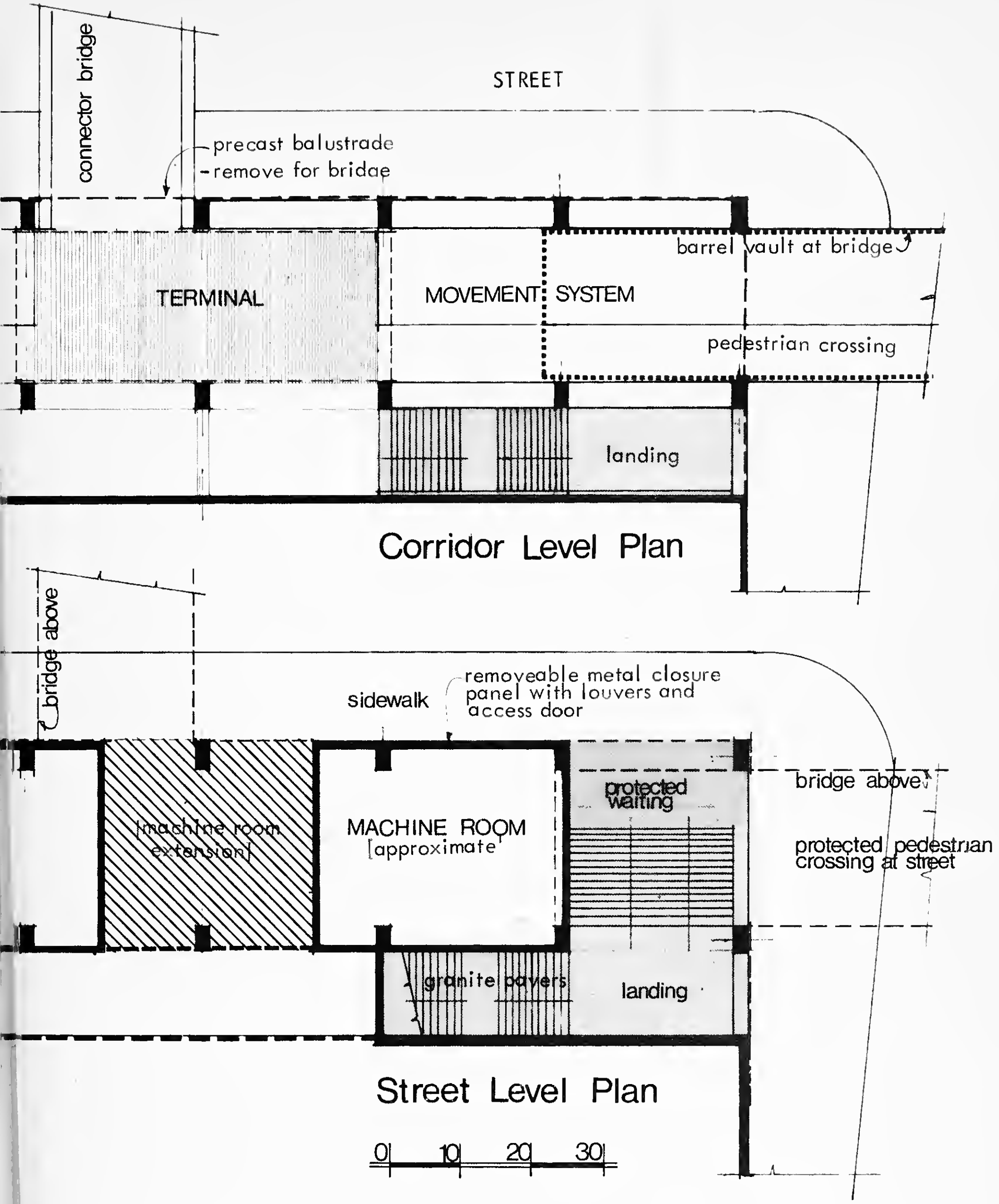
Final design development will include a detailed prototypical access element describing the range and extent of conditions which developers of different parcels must expect.

Materials:

Treads:	Granite
Balustrades:	Masonry (selected for flexibility)
Handrails:	Steel Bar
Landing:	Masonry pavers
Machine Room Wall:	Masonry
Ceiling:	Bottom of bridge structure - concrete

Lighting and Environmental: Lighting and infra-red comfort heating and snow melting are recessed in the ceiling above treads.

Access Module Pedestrian Capacity: Capacity should be tested against Level of Service standards outlined in Section 5B--page 49, during final design when volumes are more certain.



PLAN-TYPICAL CORRIDOR
ACCESS MODULE

PLATE 5C-4

ACCESS-EGRESS POINTS: [Jackson & Moreland Extract]: "Access governs the capacity of end loading moving walks, -it is probable that the limiting access volume per access lane is between 2,200 and 2,500 passengers per hour. A hand rail or strap must be provided for every passenger. In consequence, a two lane moving walk is the limit in width." "The outstanding consideration at exit from a high speed moving walk is the prevention of pile-up from too rapid deceleration. The deceleration should be low enough to allow a passenger following another to step aside as he overhauls his predecessor."

Physical Constraints: "Except in the case of side loading belts, access to moving walk systems require no special features, except adequate stationary sidewalks for the approaching passengers." "Exits from accelerated linear moving walks require room for the expansion of the walk to accommodate lateral motion of the passengers as they are decelerated."

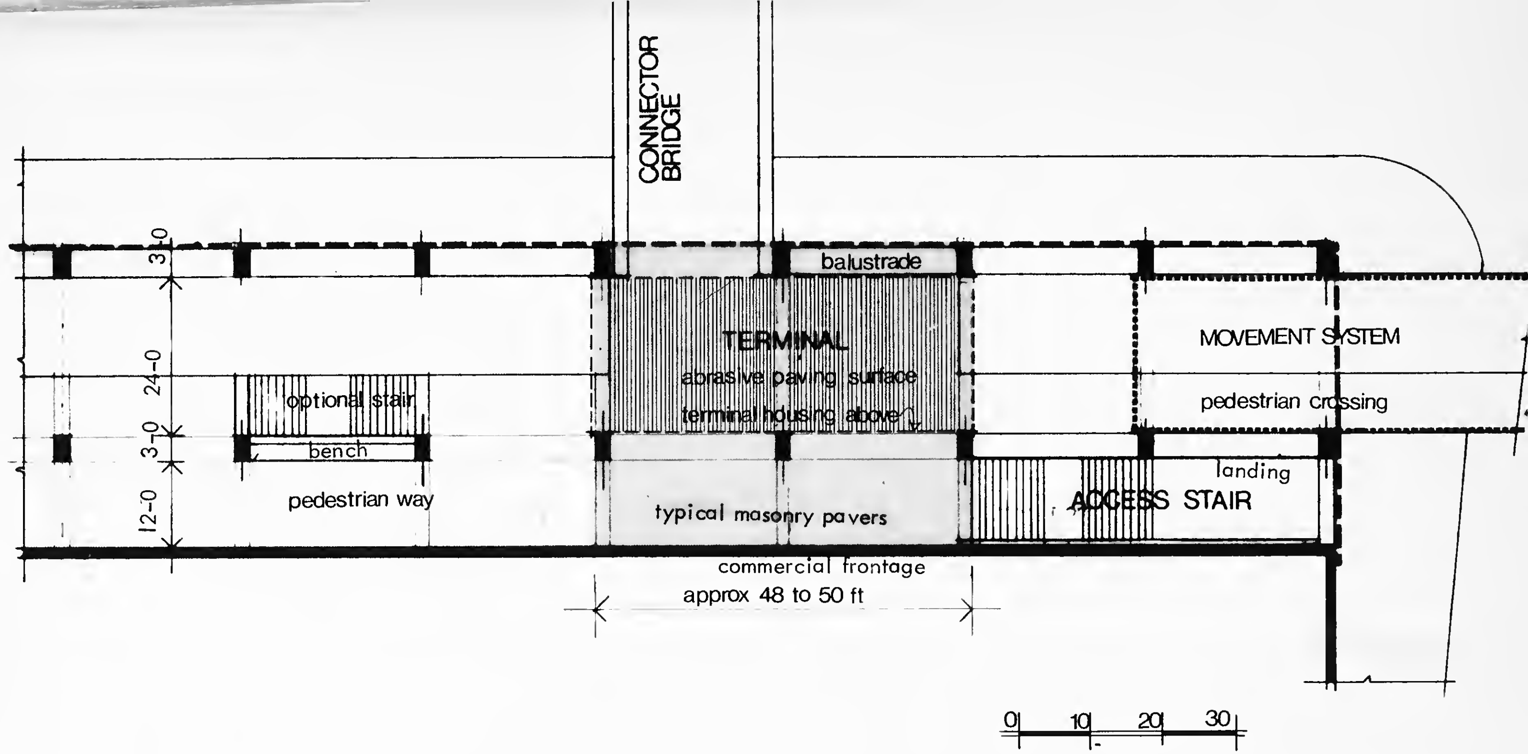
MOVEMENT SYSTEM ACCESS POINT HUMAN OBJECTIVES: [Jackson & Moreland]:

[1] Orderly visual atmosphere both on the moving walk and at access points to avoid pedestrian disorientation and illusory effects and to assure observation of important information devices.

[2] Simple, clear aids to orientation of pedestrian -- orientation graphics, maps, directional signs.

[3] Clear walking routes within the access area, identification of where the service is, and other required basic elements of information.

[4] Lighting to accent comb plates and belt surfaces or any other surface requiring atten-



MOVEMENT SYSTEM TERMINAL
MODULE – CORRIDOR LEVEL

PLATE 5C-5

tion by pedestrians with poor visual acuity.

[5] Public address systems and closed circuit television monitoring for pedestrian security and detection of system malfunction, whereby a Central Maintenance Department can be automatically communicated with.

[6] Ramps and elevators for disabled persons to allow them to reach the elevated moving walk.

[7] Adequate space at access and exit station platforms.

MOVEMENT SYSTEM ACCESS POINT DESIGN CRITERIA:

Second Level Movement System:

[1] Legibility: Ease of recognition and identification by user both on and off the system;

[2] Safety: Good footing, clarity of planning, proper lighting;

[3] Materials: High coefficient of friction where good footing is required; corrosion resistant to moisture, salt, and dirt;

[4] Graphics: Sufficient and clear to implement traffic flow and proper orientation as to where the service is, -- position of terminal relative to the CBD and Corridor;

[5] Pedestrian Flow: Implement and minimize conflicts;

[6] Commercial Viability: Locate so as to optimize amount and quality of commercial frontage potential, using as an objective the exposure of the pedestrian to this frontage while at the same time responding to his need to make an efficient trip.

[7] User: Optimize desires of different users: Commuters, Shoppers;

[8] Lighting: Lighting at access points is especially critical; high intensity illumination should be provided at combplates and terminals or any surface requiring attention.

[9] Environmental: Important that this area be kept free of weather;

[10] Permanence - Flexibility - Phasing: Terminal areas and components should be permissive of phasing -- and with removeable balustrades for introduction of connector bridges, be permissive of movement system service. Lighting, graphics, and monitoring should be incorporated in a simple, independent component capable of simple maintenance and repair, and of adapting to different building contexts;

[11] Critical Dimensions: Width: Width of Movment System R.O.W. as finally established and approximately 50'-0" long.

BRIDGE LOCATION: [CRITERIA]

[1] Fall within right angles to streets and most probable grid orientation of buildings along corridor if possible;

[2] Not to block sight lines at intersections of streets;

[3] Stay clear of intersections;

[4] Shortest distance possible in spans;

[5] Supported within property lines along the route and within the normal building structures or by the simplest modification possible (see structure)

BRIDGE DESIGN: [CRITERIA]

[1] Width: as wide as possible within terminal zone constraints;

[2] Co-ordinated with developers each side so as to optimize location relative to columns and supports, etc.; [Note: First developers will exercise greatest effect.]

[3] Surfacing, construction and finishes are to conform to corridor design specifications - jurisdiction, etc., must be coordinated with city ;

[4] A clear direct access stair to street from the bridge must be provided at face opposite corridor. (see example and access stair guidelines);

[5] Signing must be provided to corridor standards;

[6] Minimum clear height 14'-6" over streets. The surface elevation opposite the corridor must conform to the basic horizontal elevation of the corridor at the inception point of the bridge;

[7] Appearance must be similar to that of primary corridor in order to optimize corridor continuity and identity.

Description:

BRIDGES ARE OF 2 TYPES (STANDARDIZED WIDTH 2'-0" CLEAR FOR PURPOSES OF ESTIMATING THIS REPORT):

TYPE A: Pedestrian only (Connector Bridges): Typical crossing at Summer Street to adjacent parcels (Bridges CBl through CB5 -- See Phasing Diagram).

TYPE B: Corridor Bridge (pedestrian and movement system: Bridge establishing continuity of corridor and carrying the movement system plus a pedestrian way, with weather closure and possible environment control.

Structure: Structure of pedestrian bridges will be separate from the support system of the movement system itself where spanning streets. It is recommended that the movement system be supported internally on additive steel trusses. This permits uniformity in dealing with bridge design and separation of the movement system from the bridge structure and its deflection, expansion, etc. The bridge itself is recommended as having its own independent system of steel trusses spanning from machine room to machine room on either side of the street. These members would support a precast balustrade and fireproof precast flooring system.

The use of steel spanning members is presently seen as most economical, flexible and appropriate to site conditions. It should, however, be re-examined at the time of final design to assure its continued appropriateness.

Corridor planning, in holding bridges separate from the building structures which receive them, using machine room blocks for support, is permissive of alternate spanning systems, such as precast , should final design dictate.

Paving Surface: The paving surface should match that of the Corridor itself.

Lighting: Continuous strip lighting under balustrades and in movement system balustrades

Dimension: Dimensional constraints presently range from 20'-0" to 22'-0" clearance of column R.O.W. Final design and selection of movement system is required to clarify exact width required.

Coordination: Coordination between parcels on opposite sides of streets is necessary; buildings opposite on the north of Summer Street wil find bridge locations fairly pre-determined by corridor construction. Developers should anticipate satisfying dimensional and access constraints, in addition to structural loads.

Environmental Control: (See 'Environmental Control' following)

An air handling system with electric coils which would ventilate the area mechanically year round and introduce heat during periods of extreme cold is recommended.

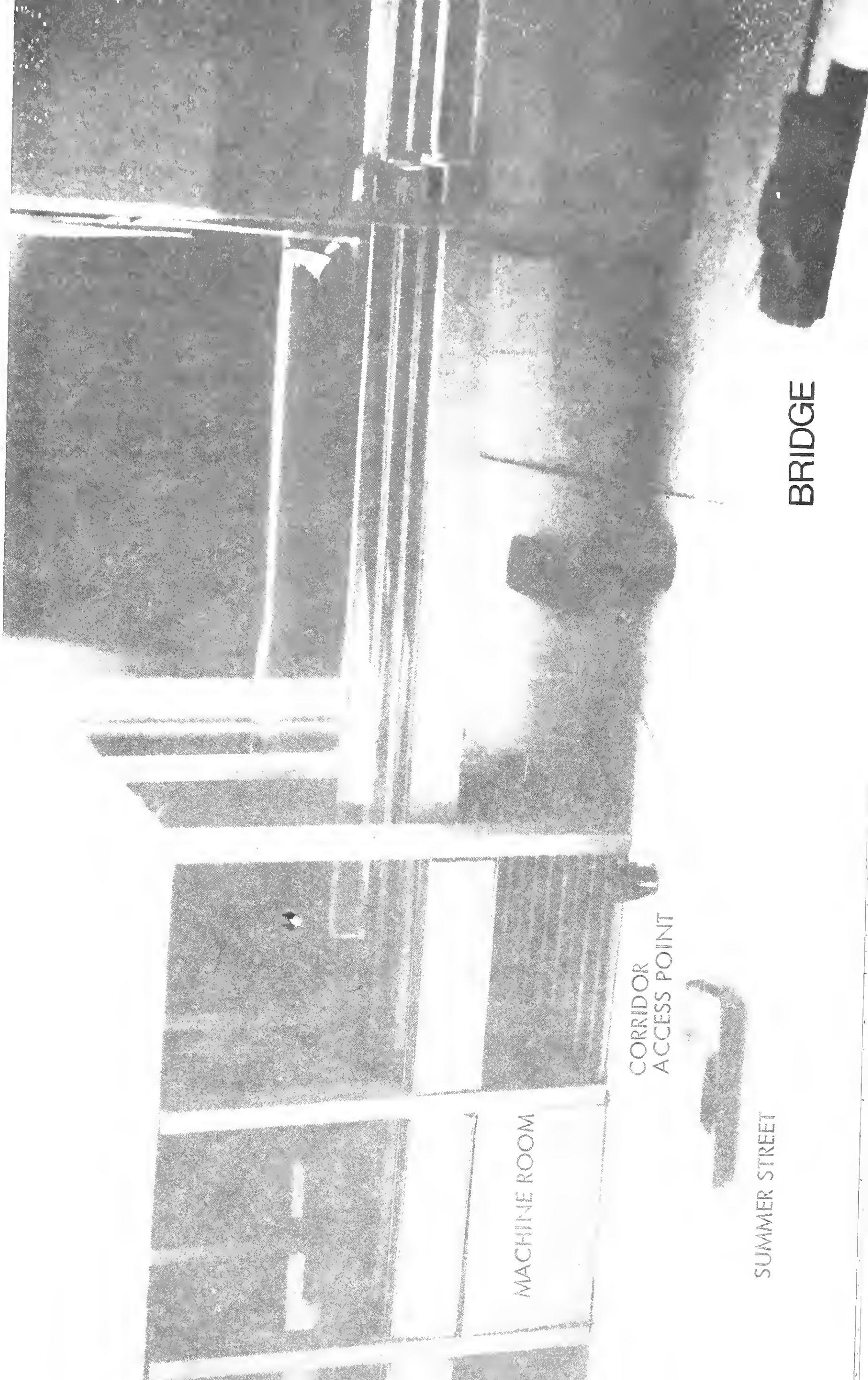


PLATE 5C-6

BRIDGE CLOSURE: A STANDARD BARREL VAULT WITH 12'-0" RADIUS AND A 1/3 DOUBLE VAULT FOR SUN SCREENING AND SUMMER COOLING, RIBS 3'-0" ON CENTER.

The barrel bault is proposed because of its classic form, legibility and ready recognition, efficiency in closure, ease of fabrication, and the environmental character it affords the pedestrian. A partial double vault is recommended as a means of effectively screening direct summer sun at bridges so as to lend continuity of experience, and minimize temperature changes that could affect support and down-time. This closure would extend some 6 to 12 feet into building cover until the angle of exposure was satisfied and would rest on the bridge structure, totally independent of building constraints or connections.

The vault would be top-vented and environmentally controlled so as to simulate continuity of temperature with the corridor.

Material: Plexiglas: Tinted plexiglas is recommended for these characteristics:
[1] Impact resistance;
[2] Optical clarity [no illusion of thickness];
[3] Outdoor durability;
[4] Light weight [minimum constraint on support system and bridges - 50% as heavy as glass];
[5] Cementability: sheets or components may be bonded together into assemblies if necessary;
[6] Chemical resistance;
[7] Solar energy and glare control;
[8] Surface hardness;
[9] Cost economy: spans, sizes, weights, installation;
[10] Scratches: repairable by in-situ abrasive treatment;
[11] Special forms without special cost.

Framing system for purposes of this preliminary report is on a 3'-0" module. Analysis during final design may permit an increased module properly recognizing the lightweight characteristics of the plexiglas and minimizing its support system. The system has been estimated as anodized aluminum. This material needs to be examined relative to corridor criteria and permanence.

Cost: $24.00 SF floor area, furnished and installed, including support.

CLOSURE AT CORRIDOR MODULES: FOR PURPOSES OF THIS STUDY, CONVENTIONAL ANODIZED ALUMINUM FRAMING AND TINTED PLEXIGLAS IS PROPOSED AT THOSE MODULES REQUIRING CLOSURE. THE CLOSURE SUPPORT SYSTEM SHOULD BE CAREFULLY EXAMINED TO DEVELOP A SYSTEM OF 'MINIMIZED' SUPPORT (E.G., CLIPS) APPROPRIATE TO APPLICATION IN MODULES OF DIFFERING SIZES, AND THE SPECIFICATION AND DEVELOPMENT OF A FASTENING AND SUPPORT DEVICE TO THE SURROUNDING STRUCTURE OR COLUMN CONTEXT.

PRESENT PLANNING RECOMMENDS THAT SUCH CLOSURE ONLY BE EMPLOYED AT THOSE FEW CONDITIONS WHICH CAN BE DEMONSTRATED AS PARTICULARLY SUBJECT TO EXPOSURE. A METHOD OF CLOSURE ON THE MODULAR BASIS WOULD BE PROVIDED FOR INSTALLATION ONLY AFTER A PERIOD OF OPERATION OF THE CORRIDOR HAS DEMONSTRATED A PARTICULAR NEED. AT THIS TIME, WITH THE DEGREE OF CHANGE ANTICIPATED IN THE STUDY AREA AND THE UNPREDICTABLE QUALITIES OF TALL BUILDINGS AND URBAN STREETS, WIND CHARACTERISTICS CANNOT BE IDENTIFIED.

COST: CORRIDOR CLOSURE AND SUPPORT, FURNISHED AND INSTALLED FOR A TYPICAL MODULE: APPROX. $10.00 S.F.

CHAUNCY STREET CORNER:

Planning and development: Planning and development has responded to these criteria: [1] accommodate a transit station; [2] permit extension along Chauncy should this prove in the interests of CADS and the CBD; [3] permit phased construction of the bridge to the Mall; [4] optimize viable commercial frontage at both levels for the Developer of a difficult corner; [5] provide some protection for persons exiting from the transit or leaving the Corridor; [6] accommodate an escalator; [7] accommodate the straight line route required by the movement system.

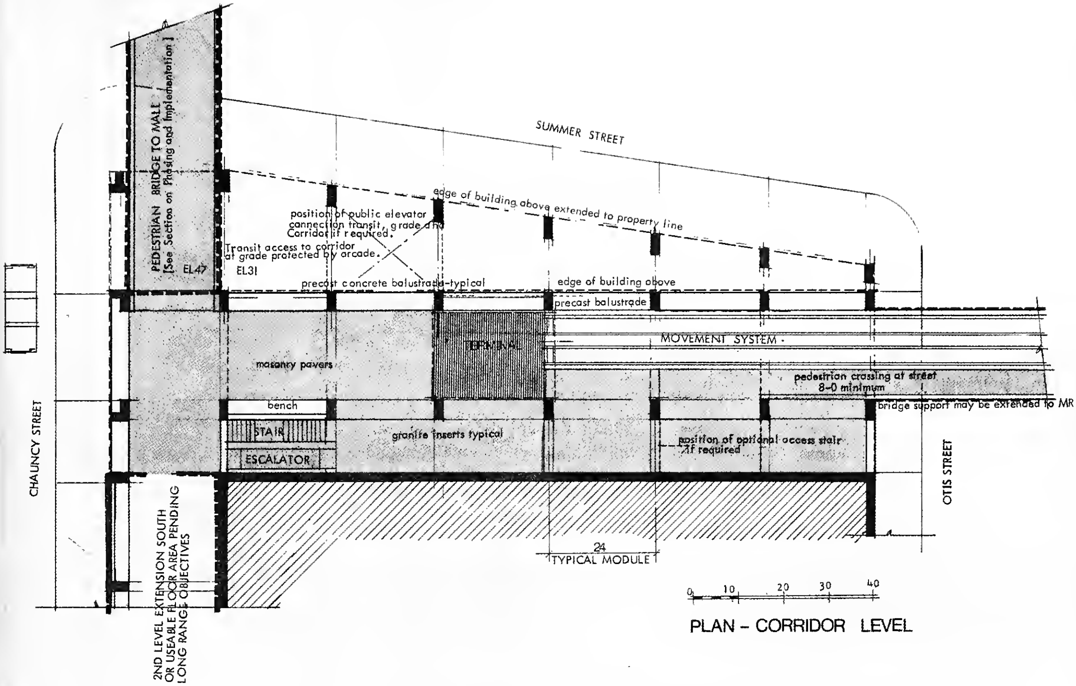
Since the actual configuration of the building for Parcel D1 is uncertain, for purposes of this study, it has been assumed that the building would front on Summer Street to the property line, and the space formed responding to the straight line requirements of the movement system plus the most probable grid orientation for columns dictated by the parcel shape naturally form a protected overhang at ground level receptive of the transit station and providing weather protection between it and corridor access.

The standard stair module has been modified to receive an escalator to implement traffic flow from the transit. Capacity of this stair may be limited during phase 1 prior construction of the Mall bridges, but planning constraints at this corner are so complex that it is recommended that a possible capacity deficiency be accepted for an interim period until the bridges are complete. A removable temporary stair may be installed if the need is critical, the optional stair position activated, or elevators, if required, could relieve this load.

The corner presents the opportunity for connecting all pedestrian levels and the MBTA concourse below via elevator. A preferred position has been indicated on diagrams following. Should elevators be provided, it is suggested that glass or plexiglas enclosures be considered for cabs in order to ensure their attractiveness to the general public.

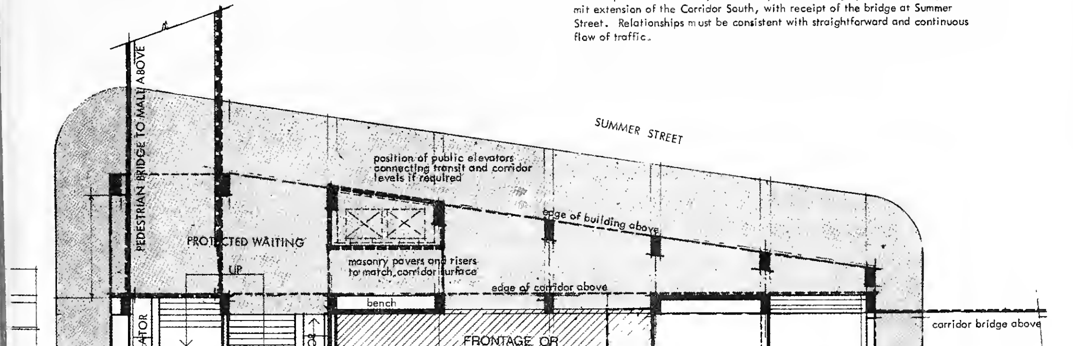
The developer of this parcel has the special opportunity of connecting with the MBTA station concourse and all pedestrian levels, at the terminal end of the corridor with particularly strong frontage potential if his planning permits a vertical "mixing box". This potential should be encouraged. The corridor thruway however, must be kept clearly legible.

The position indicated for the transit is a most direct connection to the existing tunnel. Daylight can be introduced under the landing and the overall connection made quite pleasan



PLAN - CORRIDOR LEVEL

General Note: The drawing is intended to establish relationships only, - it is important that the elements indicated, eg. stairs, transit station, protected waiting, etc. occur in a manner that both optimizes their relationships and connection, but also optimize frontage potential, and permit extension of the Corridor South, with receipt of the bridge at Summer Street. Relationships must be consistent with straightforward and continuous flow of traffic.



PLAN-STREET LEVEL

PLATE 5C-7

GENERAL PERFORMANCE:

Maintenance: Minimal. Select for maintenance ease and ability to appear clean, allowing that initial cost can be offset over a period of time.

Permanence, Durability, and Availability: Materials shall be generally available over a period of time so as not to become difficult to obtain, repair, replace and maintain when installed in an urban system which may endure for an indefinite period of time. Materials should be incorporated in such a way that they are readily replaceable and removeable in the event that the LAB IS THE CITY experiment proves erroneous.

Vandalism: Select for ability to resist and endure public abuse, neglect and vandalism.

Climatological: Materials shall be corrosion resistant to moisture, salt, dirt, and accept summer-winter temperature change.

SPECIFIC REQUIREMENTS:

Movement System Walking Surface Materials and Colors: Treads and base structure should be kept visually dark enough to prevent 'free-floating' feeling due to the walk's motion. (Note: Dark plastic laminate finish side panels appear visually extremely effective--with stainless steel tops for cleanliness and clarity.)

Terminals: Surface Treatment: Provide a high co-efficient of friction where good footing is required--corrosion resistant to moisture, salt, dirt.

Movement System: It is recognized that materials for the movement system itself require careful consideration and specification, and it is urged that such specification be

incorporated into a performance specification for the system. Selection of finishes should be coordinated with the architect.

Paving Surfaces: Careful selection of paving surfaces provides a means by which the pedestrian corridor which will lie primarily within a context of new or changing construction can suggest a thread linking together the surfaces of 'old' and new Boston.

THE FOLLOWING MATERIALS ARE RECOMMENDED SUBJECT TO FURTHER DESIGN DEVELOPMENT, CRITERIA DEFINITION, AND APPROPRIATENESS.

Masonry Pavers and Abrasive Masonry Pavers: Masonry pavers are recommended as (1) providing a permanent, easily-maintained surface (2) readily identifiable surface colour and texture meeting both the desire to relate the pedestrian corridor to the overall pedestrian fabric of the city -- identity and the need for corridor continuity and legibility.

Granite Treads and Inserts: Granite is proposed for its availability over a long period of time in the New England Region (in contra-distinction to special finishes or mixes) -- its permanence in a major pedestrian way (assuming the corridor to be permanent, and, if not, resaleable), and its character and quality.

Precast Concrete Balustrades at Corridor and Bridges: Precast concrete is recommended as providing an identifiable image, appropriateness to both bridges and balustrades establishing continuity, ability to control colour and texture during phased construction, ability to modify dimensions of simple forms for context differences, permanence.

Metal Cladding: Steel cladding of environmental control packages, access and closure panels at machine rooms, access panels at bottom of movement system.

Tinted Plexi-Glas: Lightweight weather closure at bridges carrying movement system or modules requiring protection.

STRUCTURAL APPROACH: Structural support for the moving walkway and all of its related mechanical equipment, and fixed floor surfaces, bridges and balustrades related thereto, are as extensively as possible to be provided by the structures through which the pedestrian corridor passes. It is suggested that actual construction of the pedestrian corridor coincide with that of the various development parcels, each parcel completing the corridor within its envelope, including space for machines and other mechanical equipment related to the drive system. Installation of the movement system, its integral structural members, weather closures, bridges, and orientation devices would not be included in the construction of the development parcel. However, all necessary connections for the structural supports, temporary shoring, and other elements of construction should be built into the building structure of each development parcel for the future installation of the moving walkway system, its bridges and connecting floors and stairways.

The approach is to predesign into the structure of the buildings and their foundations adequate provision to carry the anticipated loads of the moving walkway system and all of its appurtenant members, structures, and equipment, adequate clearance for installation of all elements of the system, and conformance of the building to all codes affecting the walkway system and its enclosure. The moving sidewalk system is self-supporting for spans up to 28 feet.

STRUCTURAL LOADS: Based upon the limited information available at this time, the Engineering Consultants advise a floor design load of 250 pounds per square foot of moving walk as adequate except where drive shafts are located. A moving walk more than 500 to 700 feet long would require intermediate drives along its length. At the drive points, a machine room with a floor capacity

of 150 pounds per square foot will have to be provided. A horizontal load of 25 pounds per square foot of moving walk must be resisted due to braking and starting. Roofs must be designed for a live load of at least 40 pounds per square foot and consideration must be given to the possibility of snow build-up. Exterior vertical surfaces must be designed for a wind load of 20 pounds per square foot. Non-moving walks on the second level shall be designed for a live load of 100 pounds per square foot and a superimposed dead load of 50 pounds per square foot. Structural members shall have adequate protection against fire and weather. Members that are part of a required egress or exposed to a hazardous condition shall meet the requirements of fireproof construction as defined in the Boston City Code. All stairs from the second level to the grade shall be of fireproof construction and shall be designed for a live load of 100 pounds per square foot and a superimposed dead load of 100 pounds per square foot.

ENVIRONMENTAL CONTROL: GENERAL:

The range of conditions that can be achieved within the pedestrian corridor encompasses bare minimal ventilation required for life support to a completely controlled environment. It is the intent of this report to determine the most desirable conditions to be generated and the means of accomplishing this.

Criteria: A number of extra and intra corridor factors contribute to the conditions to be encountered in the corridor, not the least of which are the occupants themselves. In addition, there is solar heat gain, heat losses, city dust and vehicular exhaust air pollution, and finally sound pollution.

Enclosed Corridor:
Should the corridor be enclosed, or contained in an "envelope", electrical heat gains, although probably remote, must be dealt with and it is felt that all contributions should be considered jointly rather than separately.

The above denotes the contributing thermal and material pollutants to be controlled. Next, the internal conditions that can be tolerated must be established. While a year-round 72 degree F ambient with controlled humidity levels might appear to be ideal, it is not only not economically feasible, and not necessary, but probably would create problems of its own.

In winter, warmly dressed people entering an envelope from an extremely cold environment would be uncomfortable. Correspondingly, to leave an atmosphere of high heat and humidity to enter a cool dry area only to return shortly to the same high heat and humidity would also be uncomfortable.

It would seem that ideal corridor conditions for an enclosed system should not differ drastically from that to be encountered outside at any given time. The seasonal extremes should be blunted, but not entirely alleviated. Moving air in a moderate atmosphere would be the best condition to be attained.

Attention must be directed, at this point, to the necessity of a careful balance of pressure between "envelope" and the outside environment and between the "envelope" and any stores opening upon the sidewalk. An improper balanced condition could result in an influx of cold, hot or unclear air from the outside environment. Moreover, it could create a problem with abuters by introducing greater loads for their heating and cooling equipment and even cause difficulty with door operation.

Semi-Enclosed, Weather-Protected Corridor:
It is strongly recommended both for cost implications and basic philosophy and criteria for corridor development, that environment control be limited to 'weather protection' of the user and tempering of the environment.

These considerations stem from use of the overhead cover afforded by the buildings through which the corridor passes and closure of bridges carrying the movement system. The intention would be to provide 'comfort heating' so as to make the corridor attractive to the user, and improvement over the normal street, melt snow and ice, and protect the movement system and users from both summer and winter extremities at bridges where expansion and exposure are difficulties.

Radiant heat, either electric or gas, would be an economical solution, requiring little donatio[n] of space by developers or the city. Radiant heat, would warm portions of the system and adjacent surfaces, providing a measure of comfort compared with uncovered pedestrian areas of the city.

At covered bridges, heat buildup in the summer and heat loss in the winter coupled with the

relatively small volume of space indicates some form of tempered mechanical ventilation.

Without provisions for locations for radiant heat, another means must be provided. The obvious solution is an air handling system with electric coils which would ventilate the area mechanically the year round and introduce heat during periods of extreme cold.

It is recommended that at such time as these systems are actually in design, a heat balance be run which would show if sufficient heat could be removed from those areas with infrared heating to maintain a reasonable level in the covered walkway areas. It is impossible at this time to make such a determination and correspondingly separate electric heat for this area must be considered.

SYSTEMS:

This is no limitation to system selection based on availability of energy. As well as there being the expected fuel sources, there is abundant district steam. Therefore, this aspect does not affect our considerations.

Radiant heat, either electric or gas, is an immediate consideration for heating. It has the ability to impart comfort to people in an ambient as low as 40 degrees. It would warm the portions of the system, such as tracks and handrails, that are in direct contact with the passengers. It can readily be used for snow melting at entrances and exits. Such a system would be mounted out of sight and reach and so be reasonably free of vandalism.

District steam could be used to provide a slab heating system to be used at aprons and ramps and a method could be devised to introduce heat through the belts. However, this system appears to be innovative and probably should be avoided in a system that is quite innovative in itself.

Steam or steam-produced hot water could be used in incremental unitary equipment. This would be quite inexpensive to install and operate, but has the disadvantage of high maintenance in the public area. It is essentially not attractive and is quite vulnerable to vandalism just because it is in sight and obvious.

ELECTRICAL:

General: The efforts, under other sections of this study, have developed requirements for large amounts of electrical energies. These include:

(a) Power for drive equipment for moving sidewalks;

(b) Energy for people heating (radiant heat);

(c) Energy for any mechanical heating and/or ventilation required.

To this accumulated load will be added the lighting requirements, both for general illumination and sign lighting as required.

The sequence of design brings forth the following items which must be considered:

(I) Primary source of electrical energy;

(2) Method of distributing electrical energy throughout the system;

(3) Operating voltage/s of both distribution system and various using components;

(4) Lighting system/s and control.

This phase of the study cannot attempt to finalize on what shall be done since there are many major decisions required. The two prime questions being (I) the authority who will operate the system and (2) extent and sections of system which will comprise the initial operational phase.

The following articles, therefore, are meant to either set forth the area for future, concentrated studies or to establish a basic design criteria which will be developed in future stages of design.

LIGHTING: There are many considerations which must be factored into the illumination design:

(1) Illumination level/s
(2) Vandalism protection
(3) Maintenance
(4) Lamp life
(5) Existing illumination sources
(6) Architectural treatments
(7) Future additions or revisions

Jackson & Moreland studies set forth one fact that stood out as the most critical in the entire point: "The system must be designed to accommodate the one exception to the rule."

With that in mind, a standard "corridor" or "enclosed mall" lighting system which attempts to produce a lighting level intensity of 20 to 30 foot candle that is primarily aesthetic and directly aimed at treatment to the architect will not be acceptable.

A few of the extreme problems encountered will be providing sufficient light at the floor level to allow for recognition of various colours or shades in flooring covering to allow recognition of different speed tracks. This must accommodate persons with bad vision such as poor colour identification.

The flare of brightness factor of the luminaire must be controlled to allow for persons with glaucoma condition.

The solution to cover all conditions will be two sources of light -- one a continuous light line that will be mounted under the handrail. This unit will be controlled for operation only during overcast days or at night. The second will be a general lighting system which will be located on the ceiling.

The potential problem of strobe effects should be considered from the ceiling lighting and thus initial design should be geared toward utilizing a high discharge lamp. Possibly a quartz lamp could be used to cut back on the luminaire size, but the long life and lumer per watts quality of high discharge lamps should gravitate the initial survey towards them.

Since electric radiant heating source is to be utilized, the intent is to utilize a common structure to house it and the light source. This could be designed on a modular, plug-in concept. Under this scheme, if there were a failure (from whatever means), there would be no field repair but a simple replacement of entire unit and the repairs would be accomplished in a repair depot.

This cannot be accomplished easily with lighting that would be located in a handrail; but if this source were primarily a night lighting device, the maintenance, especially from a point of lamp replacement, would be less.

PRIMARY POWER SOURCE: At this stage of development, a firm recommendation as to the primary source, would not be in the best interest of the project.

There exist, of course, only two alternates:

(a) Purchase power from the utility company serving the area;

(b) Produce the facilities power requirements by on-site generation.

The utilization of on-site generation will require a feasibility study that is beyond the present scope of this study. There are factors required which are not presently available such as:

(1) Authority who will operate system;

(2) Funding available (on site generation by

its very nature, requires a large initial capital expenditure to achieve the operation savings);

(3) Space availability for equipment;

(4) Stages of construction;

(5) More complete and definitive load analysis ;

(6) Fuel availability.

For the purpose of providing direction during the next stage of design, it is recommended that the following approach be made.

Since it is known that the initial construction stage will only incorporate a small segment of the overall system, the first and second section power requirements should be obtained from the serving utility company. During the design and construction stages, a comprehensive study should be made for purposes of determining the feasibility of on-site generation for the entire system. The design of the first segments electrical system should incorporate provisions to allow for possible changeover. The actual power plant could be included in one of the final stages of design and construction since, based on existing knowledge of the project and generating systems, it is only when the complete system is operational that on-site generation would become attractive.

ELECTRICAL VOLTAGE SELECTION: The previous efforts of this study have developed the utilization of vast amounts of electrical energy. These usages include, but are not necessarily limited to, the following:

(a) Power for the drive equipment for the moving sidewalk;

(b) Illumination;

(c) Energy for both mechanical and people heating;

(d) Energy for such mechanical ventilation required.

The distribution of the loads will be constant in location, (i.e., drive equipment at each end of each section of moving belts with the lighting and heating equipment distributed evenly along the route) and all loads will have long hour usage.

There are other major considerations which must be factored into the final voltage selection.

(e) Distribution system required;

(f) State of the art with regards to the actual equipment to be utilized in all phases of the facilities during design period;

(g) Sequence of construction of system;

(h) Primary source of power.

Since the drive equipment will be in concentrated areas (i.e., in general at beginning or ends of sidewalks) and shall consist of large horsepower units, the electric energy should be purchased at the highest voltage possible, which can be used directly for the drive equipment. At present, thinking stabilizes at a 4160 volt system.

At one of the centrally located mechanical rooms a transformer vault should be included and the entire system power requirements purchased at that point from the utility company.

From this point, the drive equipment in that area could be fed directly with the 4160 volt (no transformation required) and the 4160 voltage would be fed to the other mechanical

ooms directly. In turn, the drive equipment n each area would be fed with 4160 volts.

n each of the mechanical rooms a transformer vould be installed which would reduce the oltage to provide energy to power the heating nd ventilation equipment plus provide energy or the system's lighting requirements. This quipment would operate in a 277/480 volt /4 wire system.

he electric heating utilized would function at ne 480 volt level.

Giving the above items due consideration and ased on preliminary load knowledge available ne following recommendations are set forth:

) The distribution system between any two echanical areas containing drive equipment or one section of moving belt will be at 4160 olt three phase 60 cycle;

2) The large drive motors will operate at 4160 olt three phase 60 cycle;

3) Other drive motors and any mechanical quipment required will operate at 480 volt ree phase 60 cycle;

4) General illumination will operate from a 77/480 volt three phase four wire 60 cycle ystem;

5) Electric resistant heating equipment will perate from a 277/480 volt three phase four ire 60 cycle system;

6) For controls, maintenance use and other equirements, there will be 120/240 volt, ngle phase, 60 cycle power available.

hese recommendations are subject to review nd adjustment during final design period.

OWER TRANSPORTATION: This area is primarily a design development item but the utilization of high voltage will cut back on the copper size requirements. There are various methods available but in general an enclosed route would be the most feasible from mechanical room to mechanical room. The wiring methods from the mechanical rooms to the lighting equipment and/or heating and air handling equipment will be dependent on architectural considerations.

Since there will be a phase sequence to the system construction, the preliminary work phase must take into consideration all future developments to avoid costly rework wherever possible.

EMERGENCY POWER: This is a system that basically relieves the pedestrian of the physical action of walking over a given distance. With this in mind, the lack of power to the motor/s that move the sidewalk would cause no problem since the pedestrian would still be able to walk over the area, thus providing for emergency power for that use is not valid.

There is, however, a very definite requirement for lighting. The utilization of a generating system which could make dual use of the permanent lighting fixtures would be feasible. The fixtures would have to be incandescent or fluorescent in this case.

MAINTENANCE AND VANDALISM: There are immediate problems apparent, and from the studies of existing sidewalks, from maintenance. This extends into the drive systems as well. Perhaps there will be a general shut-down during the non-peak hours, especially in the early morning from 1:00 a.m. to 5:00 a.m. where a planned preventative maintenance program could be initiated. This would eliminate much of the shut-down problems because some part was not oiled on a recommended schedule.

Every care must be taken in the design of equipment which is accessible to the public. The approach would be similar to a subway

station problem. Incorporation of closed circuit television will facilitate the coverage both on equipment and pedestrian control with minimum staffing.

ESTIMATES: The previous sections and data included monies for the general illumination, resistant heating equipment and the required wiring back to the associated mechanical area.

Jackson & Moreland has included the drive equipment portion plus any associated controls.

There is a necessity for adding to each section of moving walkway the cost of service equipment in the prime mechanical area, the cost of power from this area to the secondary mechanical area and the service equipment in said secondary area.

At this stage of development, it is difficult to provide a detailed estimate of costs for the electric distribution system. This is mainly caused by limited scope of the engineering portion of the study, but from the data and directions established, it is recommended that the following allowances be included in the overall cost estimates:

Electric Service Equipment
for Prime Mechanical Area... $17,000

Distribution of Power from Prime
to Secondary Mechanical Area $2/ft.

Electric Service Equipment for
Secondary Mechanical Area.. $7,000

For Primary Electric Distribution from
Prime Mechanical Area to
Prime Mechanical Area...... $10.00/ft.

For example the entire run along Summer St. (as shown on Plate 23), there are five sections of moving walk depicted. The length of moving belts scales to approximately 1,100 ft.

The overall distance is 1400 feet. This would result in the following:

5 Prime Mechanical Areas
@ 17,000 E $85,000

5 Second Mechanical Areas
@ 7,000 E $35,000

1,100' between Mechanical Areas
@ 20 E $22,000

1,400' between Prime Mechanical Area
@ 10.00 .... $14,000

For primary cost an allowance of $20,000 should be included for the first mechanical area constructed. No attempt is made to estimate the cost of a generator system.

Section 6

SOUTH STATION CORRIDOR

Table of Contents

DESCRIPTION: THE SOUTH STATION CORRIDOR IS CONTAINED WITHIN THE BUILDING BOUNDARIES OF THE NEW PARKING STRUCTURE, TRANSPORTATION CENTER AND TRADE MART. IT SHOULD SERVE AS A COLLECTOR AND DISTRIBUTER AS DIRECTLY AS POSSIBLE BETWEEN THESE ELEMENTS AND BOTH THE SUMMER STREET CORRIDOR AND THE BRIDGE SERVING THE FEDERAL RESERVE AND FINANCIAL DISTRICT COMMUTER.

APPROACH: THIS SEGMENT OF THE MOVING SIDEWALK SYSTEM IS CLEARLY BOUNDED AND CONTAINED WITHIN THE SOUTH STATION COMPLEX, AND CAN BE IDENTIFIED AS A DISTINCT STUDY PROBLEM. SINCE PRESENT PLANNING OF THE COMPLEX IS VERY PRELIMINARY AND CORRIDOR DESIGN DEVELOPMENT IS LARGELY DEPENDENT UPON FURTHER PLANNING STUDIES OF THE ENTIRE COMPLEX BY ITS ARCHITECTS, THIS STUDY WAS LIMITED TO IDENTIFYING VARIABLES, GENERAL PLANNING CONSTRAINTS, THE CORRIDOR'S IMPACT AND POTENTIAL, AND ITS RELATIONSHIP TO THE SUMMER STREET SEGMENT AND CBD.

GENERAL: DUE TO THE DEGREE OF INTEGRATION WHICH MUST TAKE PLACE BETWEEN CORRIDOR AND SOUTH STATION COMPLEX, DEVELOPMENT OF THIS SEGMENT WILL REQUIRE DISTINCT AND SPECIFIC DESIGN ANALYSIS BY THE ARCHITECT OF THE COMPLEX ABOVE AND BEYOND PROGRAM NEEDS IN ORDER TO ACCOMMODATE THE CORRIDOR, IN ADDITION TO CAREFUL COORDINATION WITH THE ARCHITECT OF THE FEDERAL RESERVE ACROSS THE STREET. THE CITY MUST ESTABLISH CORRIDOR SCOPE, PLANNING NEEDS AND CONSTRAINTS AS PROGRAM INPUT FOR THE DEVELOPERS OF THE PROJECT.

PLANNING SEGMENTS: TWO DISTINCT PLANNING SEGMENTS CAN BE IDENTIFIED IN THE SOUTH STATION CORRIDOR [See Diagram Opposite]:

[1] The Transportation Center Concourse [with different connection alternates to the Summer Street Corridor, depending upon its position]; and
[2] Garage or Parking Structure Segment [with 2 basic alignment possibilities: edge and interior].

[Note: Plans of the Trade and Transportation Center developed by Sert, Jackson and Associates for the Port Authority have been utilized within this report as being reasonably illustrative of the probable building relationships which will develope on the South Station site.]

TRANSPORTATION CENTER CONCOURSE:

DESCRIPTION: THE CONCOURSE SEGMENT IS THAT PART OF THE TRANSPORTATION CENTER COLLECTING AND DISTRIBUTING PERSONS BETWEEN THE VARIOUS TRANSPORT MODES, -RAIL, BUS, TRANSIT, VEHICLE AND GARAGE, AND SUPPLEMENTARY DISTRIBUTION SYSTEM. IT IS A PRIME GENERATOR OF THE SYSTEM USER AS WELL AS A CONTEXT THROUGH WHICH PEDESTRIANS ORIGINATING AT EITHER END OF THE OVERALL SYSTEM MUST PASS IN ORDER TO REACH THEIR PARTICULAR DESTINATIONS. IT MUST BE REGARDED AS AN 'INTERVAL' OF THE MOVING WALK SYSTEM AS A WHOLE, AND AN 'AREA SERVED'. THIS IS PARTICULARLY SO IN SO FAR AS THE SYSTEM CANNOT BE IDENTIFIED AS SERVING ONLY THE TRANSPORTATION CENTER'S NEEDS, BUT ASSUMES A LARGER ROLE AS PART OF A CENTRAL AREA DISTRIBUTION SYSTEM SERVING THE GENERAL PUBLIC. THE PORTION WITHIN THE TRANSPORTATION CENTER, HOWEVER, CAN AND MUST BE ESPECIALLY WELL INTEGRATED WITH THAT CENTER'S PARTICULAR NEEDS.

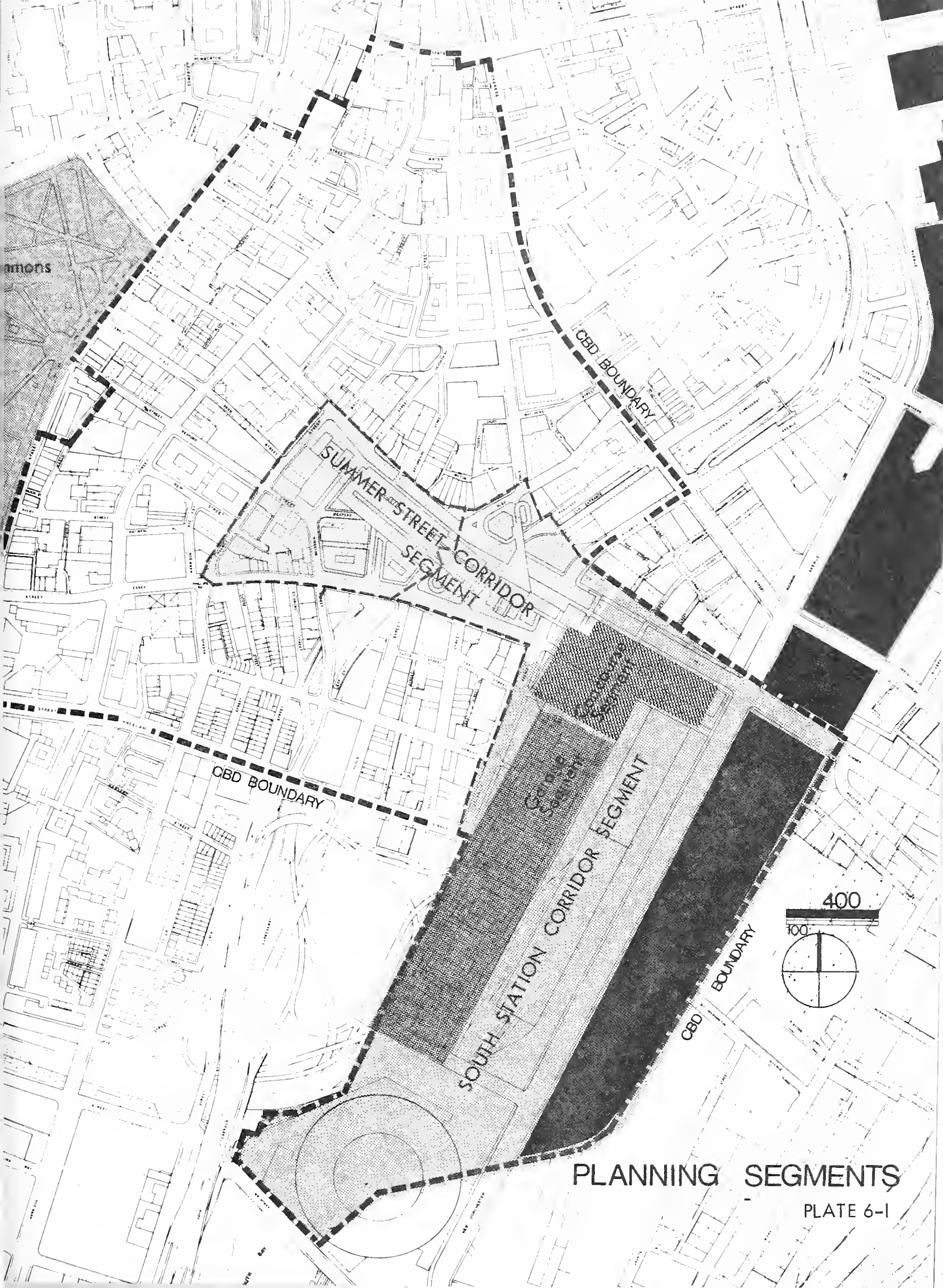
Constraints: The concourse section will be required to connect the Summer Street Corridor with the Garage Segment in a clearly legible and identifiable manner. A maximum of system continuity must be established between these systems.

Planning of this section for the sake of this report, was based upon the current preliminary plans for the Transportation Center, and attempted to respond to the relationships already established. The system cannot, howeve[r] be incorporated without special design considera[-]tion by the Architect of that complex as the requirements of the system are in conflict with the present design.

The movement system corridor in the concourse was consequently indicated at a level above the concourse floor in order not to disrupt accessibility of occupancies shown on that level and its need to freely distribute people and serve several functions, - e.g. waiting, collecting, distributing, ticketing, checking, etc. The corridor positioned at this upper level was, in addition, convenient to the apparent 'center of gravity' of the parking structure, distributing people on equal distance either up or down. The system needs to make a transition within the concourse itself from this upper level via ramp to connect to the concourse itself where it will collect concourse generated users and join the major City level.

Replanning of the Transportation Center should take into consideration the vertical position in which the corridor would best be placed in order to serve all users and avoid conflict with vehicle distribution needs.

The constraints on corridor position in the concourse are [1] clear and direction connection to the Summer Street Corridor, which has been planned to correspond to concourse elevation, and [2] form a clearly legible and continuous corridor R.O.W. as it passes through the com-



PLANNING SEGMENTS

PLATE 6-1

plex. Belt segments must follow straight-line R.O.W.'s, with limited spacing at terminals. Transition from straight lines may occur at terminals, but system continuity must be maintained in order to provide effective service.

This report indicates the movement system within the South Station Segment as ending within the concourse at a distance of some 200 feet from the terminus of the Summer Street Corridor segment [see diagram opposite]. This separation is not desirable, but is predicated upon the present layout of the Transportation Center, concourse closure position and control, the relative ineffectiveness of short belt segments, the position of the transit station between corridor segments, and the traffic study indications that the bulk of users at this point are destined for or generated by the transit system or the northern part of the CBD, with relatively fewer trips occurring between segments. Corridor continuity is still a prime objective. Exact extent of continuity should follow from the City's criteria for autonomy and the degree of integration with the Transportation Center expected of a corridor serving the general public; and will largely influence how the Architect of the complex will need to incorporate the movement system corridor in his planning.

This report assumed a concourse segment subordinate to the Transportation Center as a whole with respect to control and hours of operation, but serving the general public during these hours.

The public nature of the transportation segment will be clearly affected by development which may take place south of the Transportation Center. This development regardless of its nature will generate users destined for the North, the transit station, or Summer Street Corridor. Long range planning must assume an 'open end' to the system at this point, with ability to accommodate additional belts, and a 'general public' openness to the corridor.

The extent to which the City will wish to establish the South Station Segment as a 'public way', its surveillance, and its autonomy will greatly affect planning of the concourse and garage to incorporate the moving belt system.

Since the intentions of this report are to optimize the potential for effectiveness and impact of the moving belt system as part of a Central Area Distribution System, it must be recommended that a highly autonomous and public corridor be established within the South Station complex.

Summary: Concourse Segment constraints:
[See Diagram opposite]

The following are general constraints intended to serve as a guide in planning of the Concourse Segment of the Transportation Center complex. Movement System constraints outlined in Section 5B and General Corridor Objectives apply.

[1] Transit Connection (MBTA): Direct access and connection between transit and Corridor (Concourse Level El. 45'-0") via escalator and stair at the corner of Summer Street and Atlantic Avenue (South-East). This connection must be accessible to both Corridor segments;

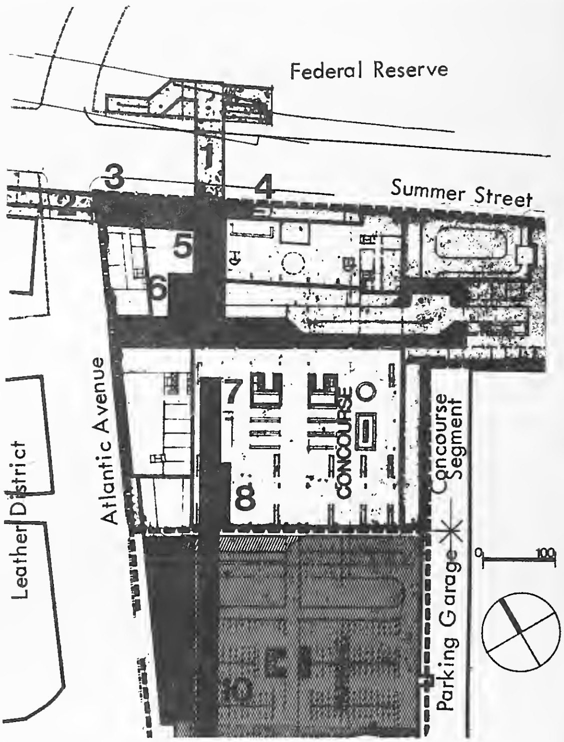
[2] Federal Reserve Bridge: Bridge connection to the Federal Reserve parcel opposite [a major width of approximately 30'-0" should be incorporated in a manner sympathetic to architects of both parcels];

[3] Connection to Summer Street Corridor: The Summer Street Corridor will terminate on a north-south axis of pedestrian distribution through the Transportation Center. The transition will need to incorporate major connections between all pedestrian levels and the transit, in addition to ensuring continuity of the public Corridor. This terminus should occur within the building envelope as design development of the Transportation Center delineates. A major connection to grade and such planning as will ensure decided pedestrian arrival points and transition between pedestrian levels, including ramping, and/or clear elevator connections between levels must be provided. The connections between the Summer Street Corridor Segment and Transportation Center Segment in itself must be clear, and planning permit proper phasing and incorporation of machine rooms, transformer vaults, terminal housing, etc., associated with the terminus of the Summer Street Se ment.

[4] The Handicapped: The Concourse Segment should expect to make provision for the handicapped moving between Concourse and street levels via either ramp or elevator.

Elements to be included in the planning of the Transportation Center Complex in the relationships indicated [See text for elaboration]:

[1] Connector bridge to Federal Reserve at concourse level, el.45 unless ramping to lower bridge is possible;
[2] Terminus of Summer Street Corridor Segment [including machine rooms, terminal, etc.] must be received at corner of Atlantic Avenue-Summer;
[3] Corridor Access Stair to gradefrom Corridor at Atlantic Avenue corner in a clearly legible manner;
[4] Ramping transition between Corridor level and grade [unless elevator connections possible];
[5] MBTA [transit] Station with a major underground concourse connection to the Federal Reserve Parcel corner opposite;
[6] Stair and escalator connection between MBTA [Transit] Station and Corridor level;
[7] Terminus of the Transportation Segment of the system ending as closely as possible to the Terminus of the Summer Street Corridor segment
[8] Terminal permitting access-egress from system to the concourse where it first enters from garage segment;
[9] Central Control and Maintenance facility preferred location with service vehicle access;
[10] Intermediate access terminals with vertical circulation between system, garage, and street.



GENERAL PLAN CONSTRAINTS

PLATE 6-2

GARAGE OR PARKING STRUCTURE SEGMENT:

DESCRIPTION: THAT PORTION OF THE SYSTEM SERVING THE GARAGE AT THE SOUTH STATION COMPLEX. THE SYSTEM IS EXPECTED TO INCREASE LEATHER DISTRICT ACCESSIBILITY AND BE CAPABLE OF EXTENSION TO THE SOUTH OF THE GARAGE. IT IS RECOMMENDED THAT IT BE HIGHLY AUTONOMOUS, PUBLIC IN CHARACTER, AND DEVELOPED ON THE ATLANTIC AVENUE EDGE OF THE GARAGE.

GENERAL: THE GARAGE IS CONTAINED ON THE EAST FACE BY THE NEW POST OFFICE COMPLEX AND BLOCKED FROM ACCESS TO THE CHANNEL, AND FRONTS ON ATLANTIC AVENUE OF THE WEST FOR SOME 900 FEET, ALMOST HALF ITS LENGTH, THEN UPON THE CENTRAL ARTERY - MASS. PIKE JUNCTION OPPOSITE THE SOUTH COVE. THIS JUNCTION IS PRESENTLY A NO-MAN'S LAND, BUT A POTENTIAL LAND BANK TO THE CITY. AT THE SOUTH IT TERMINATES IN THE PARCEL AT VARIOUS TIMES CONSIDERED AS A PRIME STADIUM SITE. ITS ACTIVE ORIENTATION, THEN, IS TO THE WEST, AND AS A COLLECTOR, TO THE SOUTH. IT IS PROBABLE THAT A VOLUME OF COMMUTER TRAFFIC WILL BE DIRECTED TOWARD THE SOUTH COVE AND ITS INSTITUTIONS, AND ACCESS SHOULD BE PROVIDED AT THE BASE OF KNEELAND STREET.

ALIGNMENT: TWO ALIGNMENT POSITIONS WERE EXAMINED: ATLANTIC AVE. EDGE AND AN INTERIOR CORRIDOR [see preceding plate]. CHOICE OF ALIGNMENT WAS BASED UPON THE CBD AND ITS CAPACITY FOR AUTONOMY AS A MAJOR PUBLIC WAY SHOULD THE CITY SO DESIGNATE. THE ATLANTIC AVENUE EDGE ALIGNMENT IS RECOMMENDED AS MOST PERMISSIVE OF IMMEDIATE AND LONG RANGE PLANNING OPTIONS. THE CORRIDOR IN THIS POSITION CAN DEVELOP A HIGH DEGREE OF AUTONOMY, CONTROL, PUBLIC CHARACTER, GREATLY INCREASE LEATHER DISTRICT ACCESSIBILITY AND DEVELOPMENT POTENTIAL, MINIMIZE CONFLICTS WITH THE GARAGE FUNCTION, AND ADD 'LIFE' TO THE FACE OF THE GARAGE AGAINST THE CITY.

PRIMARY FACTORS OR DECISIONS GOVERNING CORRIDOR POSITION IN GARAGE: INTERIOR OR ATLANTIC AVENUE EDGE:

Autonomy and control of corridor: Degree.

Garage Replanning: Degree and extent of replanning required, extent relative to criteria.

Flexibility: The extent of vertical and horizontal ROW constraints required in order to permit which degree of flexibility or experimentation relative to system effectiveness.

Permanence: Degree of permanence and appropriateness to functions and users served [e.g. garage, leather district, south, etc.].

Accessibility from garage to adjacent Leather District: Extent of service required to Atlantic Avenue frontage. Present garage planning appears Summer Street oriented to the pedestrian and does not articulate a clear 'pedestrian route', or response to the adjacent district which could profit from increased accessibility.

Pedestrian way: Extent to which the corridor within the complex is to be identified as and understood as a 'pedestrian way'. Garage planning is presently distinctly 'vehicle oriented' and not 'pedestrian sympathetic' allowing no clear and separate route for walkers. It needs to be established whether or not the Corridor R.O.W. is intended to be clearly pedestrian oriented and articulated in form.

Distance: Walking distance from points in garage to corridor.

Movement System: Ability of the position to accommodate machine rooms, drive systems, ventilation, service access, etc.

The 'Corridor-in-the-City': Extent to which this segment is intended as a public pedestrian 'corridor-in-the-City' versus 'corridor-in-the-garage' influences planning criteria and design.

User: Connections, character and position of the garage segment are affected by the extent to which it is intended to serve [1] trip from car to street, [2] transit, rail and bus to car [see traffic study], [3] commuters or shoppers, [4] leather district and south extremity of garage.

Identity: The face presented to the surroundings by the Transportation Center at Atlantic Avenue with an interior moving walk is 'garage'. The edge alignment affords additional character to the frontage, -legibility and greater recognition of the several distribution functions performed at the Transportation Center.

COMPARISON - ALIGNMENT ALTERNATES FOR SOUTH STATION CORRIDOR SEGMENT:

ITEM	INTERIOR CORRIDOR ALIGNMENT	EXTERIOR EDGE ALIGNMENT [ATLANTIC AVE]
TECHNOLOGICAL:		Least impact or repercussion on building organization - structure in the event advanced technology necessitates sytem change; easiest position to incorporate present system requirements.
AUTONOMY:		Easiest to achieve for [1] control, [2] legal, [3] phasing, [4] character, [5] public, [6] accessibility, [7] technological, as necessary.
USER: SERVICE TO GARAGE PEDESTRIAN:	Most efficient service to all points in garage for pedestrian movement between system and vehicle, offset, however, at concourse segment. Maximum conflict with cars at movement system level.	Longer walk within garage itself for 50% of parkers; offset however, in concourse.
SYSTEM DOWN-TIME:	System down-time may be more disruptive if adequate alternatives or clear pedestrian corridor is not developed.	
LEGIBILITY IN CITY FABRIC:		Inherent
EXTENSIONS INTO LEATHER DISTRICT OR SOUTH COVE:		Most permissive of lateral connections
DEFINITION OF CORRIDOR AND SYSTEM AS MAJOR PUBLIC WAY:	Not inherently 'public'; difficult to achieve.	Inherent potential
ENVIRONMENTAL:	Capitalizes on environmental control afforded by garage, but nature and impact of vehicle should be evaluated.	More interesting than interior garage environment at minimum cost; comfort heating might be required.

ITEM	INTERIOR CORRIDOR ALIGNMENT	EXTERIOR EDGE ALIGNMENT [ATLANTIC AVE]
IDENTITY:	Subordinate to garage fabric as service element. Exterior identity of Transportation Center understood as 'garage'.	Potential of special identity as pedestrian corridor-service element to both garage and City. Exterior of Center enriched, expressive of pedestrian distributive function in addition to that of 'garage'.
CROSS-OVER CONFLICTS: [Pedestrian-Vehicular]	Pedestrian conflict with car minimized: persons traverse 1/2 of the distance of the garage from edge to center compared to 1/2 of parkers crossing the entire distance from an edge alignment.	Minimizes system conflict with garage networks, but possible pedestrian conflict with car unless garage replanning resolves.
MOVEMENT SYSTEM: Express Route-Accelerated Systems:	Does not readily accommodate express systems without major re-design of garage.	
STIMULATE DEVELOPMENT IN LEATHER DISTRICT:	negligible	encourages development

Summary: Garage or Parking Structure Segment Constraints: The following is a summary description of general Corridor constraints intended to serve as a guide in planning. Movement System constraints outlined in Section 5B and General Objectives outlined previously apply.

(1) R.O.W.: Movement System R.O.W. should include sufficient width to accommodate a minimum of 2 reversible belts in segments of approximately 300-400 ft. long, depending upon actual Transportation Center and Garage final design and the position of a clear R.O.W. for pedestrians choosing the walking mode alongside as an alternate to system use and as provision for system breakdown.

R.O.W. width is seen at this time as a maximum of 30'-0" with provision for adjacent vertical connections and access depending upon the Complex's final design. This width permits the addition of a 3rd belt should it become necessary in addition to the walking mode. This R.O.W. should describe a straight line, clearly legible and identifiable as a pedestrian way and public service. Its vertical clearance should be approximately 12'-0" clear. Its horizontal R.O.W. must allow for a continuous clear service tunnel or alternate access means to service rollers: See Section 5B on Movement System. Continuous passage, in any event, must be provided for conduit needs, and the blocks of space outlined in Section 5B for machine rooms and drive systems at ends of belt segments.

The R.O.W. should be permissive of extension at its Southernmost end, and of receipt of connector bridges at several major points into the Leather District.

(2) Central Maintenance: It appears appropriate at this time to anticipate Central Control maintenance facilities as located within the parking structure segment of the Transportation Center complex.

At the present time, no size or complete description of its requirements can be delineated. The facility is intended to house closed-circuit monitoring equipment, control panels, maintenance facilities, etc.

Location within the Transportation Complex is highly desirable for (1) accessibility to the Corridor for service, (2) compatibility with anticipated phasing of the Corridor, (3) essentially central location along the overall corridor rout (4) ability for negotiation of change of level with repair service equipment, (5) no impact on viable commercial or street frontage at the remainder of the Corridor. If maintenance carts are to originate here proper accessibility to the Corridor must be assured.

Central Control will house 2 persons operating monitoring equipment. Maintenance is expected to permanently maintain 2 persons on duty at any time.

(3) Leather District Connections: Connections are provided to the Leather District in order to increase its accessibility from the proposed parking structure. Users generated from that district will be destined for the Transportation Center Concourse, Transit station, or the North Financial District. The presence of the Corridor on the parking structure edge will clearly reinforce awareness of and development of this abutting district.

Parking structure planning must allow for possible receipt of connector bridges at streets and terminal points and provide access to grade.

General Considerations applicable to the overall Transportation Center Corridor (Concourse and Parking Structure Segments):

General: In general, constraints outlined in the previous Summer Street segment are applicable, excepting the following or those specific considerations listed in preceding pages. Further constraints for this portion of the Corridor are a function of the degree of public character the Corridor is expected to assume and the exact extent and nature of jurisdiction expected by the City over this portion of the Corridor.

Legal: Liabilities and responsibilities should be examined relative to defining the Corridor in the Transportation Center as a 'public way' and establish any necessary constraints on planning.

Ramping: A system of inclined belts might be examined in lieu of elevators for vertical distribution within the Parking Structure Segment for its ability to provide continuous service and optimize continuity of pedestrian distribution systems. Such system could integrate with the Corridor at the edge of the structure if sufficient space is allowed.

Lighting: Transportation Segment lighting should be similar to that of the Summer Street Corridor, depending on final planning. Lighting in the Concourse Segment should be anticipated as a part of the lighting solution for the Concourse as a generalized whole and not specially provided. Lighting in the Parking Structure Segment should be clearly defined and provided in addition to general illumination satisfactory for the garage. Pedestrian surface lighting should be provided in system balustrades as in the Summer Street Segment, and a high level of illumination developed at Terminal points along the route.

Movement System: At the present time, 2 belts are seen as adequate. However, provision should be made for inclusion of a 3rd at some time in the future depending upon the type of development which may take place at the South of the complex. The minimum R.O.W. width of 30'-0" required in either segment should accommodate both the movement system and a parallel walking surface.

Section 7 — IMPLEMENTATION

Table of Contents:

[This section applies primarily to the Summer Street Segment of the overall Corridor. This does not preclude, however, such reference to the Transportation Center Segment as is applicable or possible at this time.]

GENERAL: IMPLEMENTATION AND PHASING ARE ESSENTIALLY DEPENDENT UPON [1] CONSTRUCTION SCHEDULING ALONG THE CORRIDOR ROUTE, [2] STREET WIDENING OR REALIGNMENT, [3] FUNDING.

IT IS BEYOND THE SCOPE OF THIS STUDY TO PLAN THE IMPLEMENTATION FOR THE CORRIDOR, BUT THE FOLLOWING POSSIBILITIES OR CONCERNS ARE PRESENTED FOR CONSIDERATION. CORRIDOR PLANNING AND DESIGN DEVELOPMENT HAS BEEN PERMISSIVE OF CONSIDERABLE PHASING LATITUDE.

CONSTRUCTION COORDINATION: THE CITY WILL NEED TO COORDINATE ITS CONSTRUCTION WITH DEVELOPERS ALONG THE CORRIDOR ROUTE. IT IS RECOMMENDED THAT DEVELOPERS BE REQUIRED TO PROVIDE AS MUCH OF THE CORRIDOR CONTEXT AS POSSIBLE, STRUCTURAL FLOOR, SUPPORT REQUIREMENTS AND CONFIGURATION TO RECEIVE FINISHES, SERVICES AND MOVEMENT SYSTEM VIA THE ESTABLISHED MEANS. EXTENT OF CONTRACT RESPONSIBILITIES, CONTRACTORS AND PROCEDURES MUST BE EXAMINED AND INCLUDED AS PART OF THE PRELIMINARY DESIGN RECOMMENDATIONS. THE CITY SHOULD ESTABLISH ACCEPTABLE ALTERNATIVES FOR CONTRACTING THE WORK IN LIGHT OF CONTEXTURAL AND PHASING CONSTRAINTS.

PHASING ALTERNATIVES (PHASING DIAGRAM PLATE 5D-1): THE FOLLOWING ARE ILLUSTRATIVE OF THE PHASING OPTIONS WHICH MAY BE ENCOUNTERED OR PERMITTED BY THE CORRIDOR.

South Station Segment: The South Station Segment itself constitutes an entity with regard to movement system installation. It should include central maintenance and moni-

toring facility for reasons enumerated earlier, and to be permissive of a 'complete' functional service should no other portions proceed.

Summer Street Corridor: The Summer Street Corridor potentially breaks into 3 phasing segments: Parcel D1, Parcel D5, and the D7 Tower Development, Parcels D6 and D7, all of which are linked by corridor bridges. Parcels D1 and D5 may conceivably join in a joint development venture, simplifying phasing. Bridges cannot be constructed between parcels until both sides of the street have been constructed. This is true for all bridge types, -the corridor has been so planned, however, that all segments have access to the street and will be self-sustaining until the corridor is connected. Present planning intends that bridges be clear of structure and supported directly on machine room blocks.

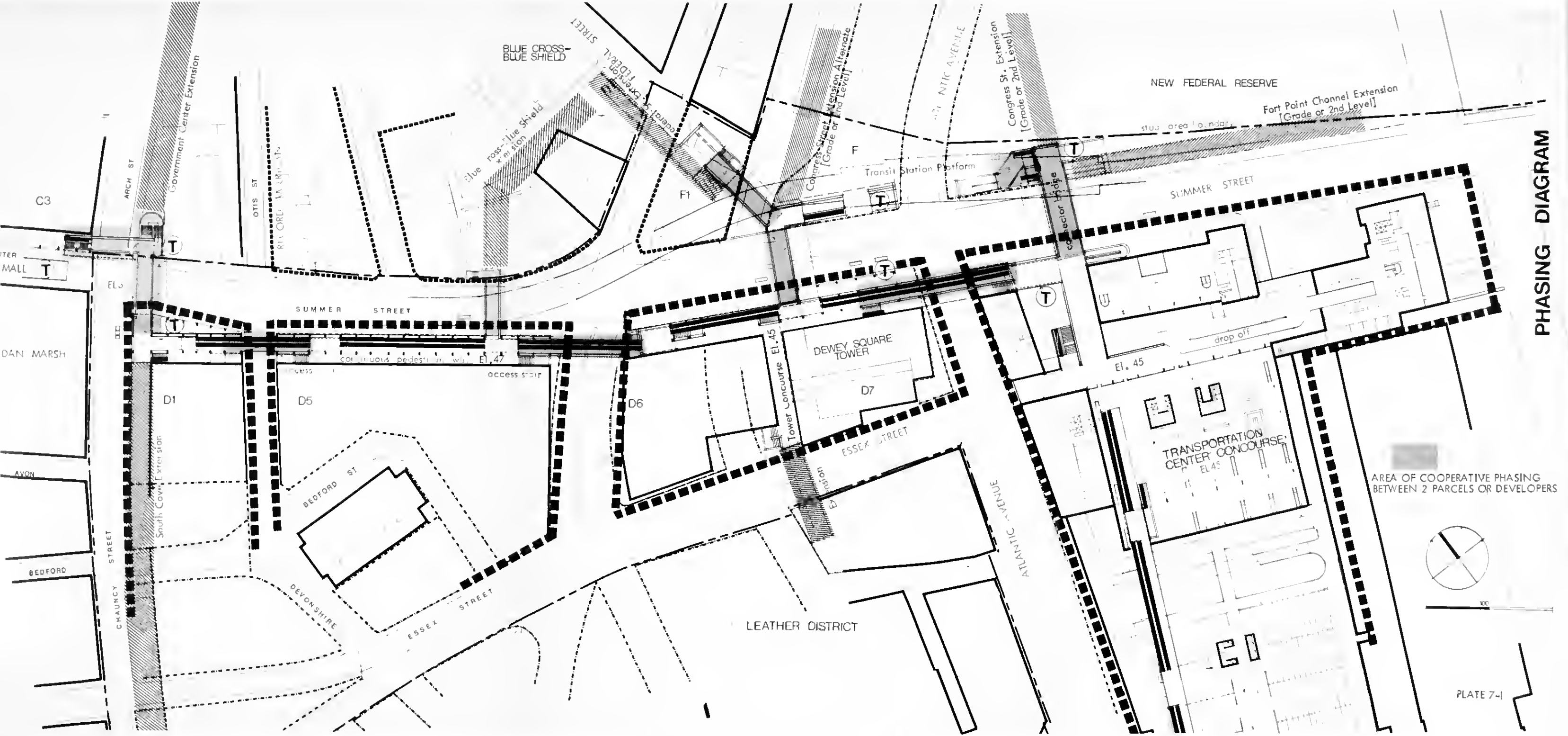
SCHEDULING: THE FOLLOWING ARE SCHEDULING OPTIONS RELATIVE TO PARCEL DEVELOPMENT SEQUENCE AND MOVEMENT SYSTEM INSTALLATION:

Separate Development Parcels D1, D5 and D7 Tower Should Summer Street segments develop individually, -i.e. 3 segments, it is suggested that the corridor R.O.W. and fixtures be 'framed in' with temporary removeable closure at the movement system R.O.W. pending installation and operation simultaneously for all 3 segments when they are substantially complete and a continuous corridor surface is afforded;

Parcels D1 and D5 Joint Venture or Combined Scheduling, and Constructed Prior D7 Tower: Should Parcels D1 and D5 combine in a single development or be constructed simultaneously, it appears efficaceous that these 2 belt segments begin operation as soon as service distribution can be afforded via D7 Tower and central control in South Station, or a temporary power source established;

Dewey Square Tower [D7] Constructed First: Movement system in D7 tower should not be installed until (A) the South Station segment is complete, or (B) until parcels D1 and D5 are complete, and then with temporary power if South Station is incomplete.

CONNECTOR BRIDGES (CB1, CB2, CB3, CB4) (1A, 1B, and 5): DEPENDENT UPON STATUS OR CONDITIONS OR PROPERTY OPPOSITE. PRECAST REMOVEABLE BALUSTRADES ARE INTENDED AT THOSE POINTS LIKELY TO RECEIVE BRIDGES. BRIDGE 5 BETWEEN THE SOUTH STATION AND FEDERAL RESERVE WILL NEED TO BE COORDINATED BY RESPECTIVE ARCHITECTS WITHIN SUGGESTED DESIGN CONSTRAINTS. BRIDGES CB2 AND ITS ALTERNATE CB3 ARE SUBJECT TO DEVELOPMENT PLANS FOR PARCEL F2 AND STREET ALIGNMENT. BRIDGES TO THE MALL AT CHAUNCY ARE SUBJECT TO SPECIAL CONSIDERATIONS FOLLOWING.


PHASING DIAGRAM
BLUE CROSS-
BLUE SHIELD
NEW FEDERAL RESERVE
Fort Point Channel Extension
[Grade or 2nd Level]
Congress St. Extension
[Grade or 2nd Level]
Congress Street Extension Alternate
[Grade or 2nd Level]
Transit Station Platform
Government Center Extension
SUMMER STREET
DEWEY SQUARE
TOWER
TRANSPORTATION
CENTER CONCOURSE
EL.45
El. 45
El. 47
continuous pedestrian way
access stair
access
drop off
Tower Concourse
Connector Bridge
South Cove Extension
ESSEX STREET
BEDFORD ST
DEVONSHIRE
ATLANTIC AVENUE
CHAUNCY STREET
ARCH ST
OTIS ST
BEDFORD
AVON
MALL
C3
F
F1
D1
D5
D6
D7
LEATHER DISTRICT
AREA OF COOPERATIVE PHASING
BETWEEN 2 PARCELS OR DEVELOPERS
PLATE 7-I

CHAUNCY STREET AND MALL CONNECTION: EXTENSION OF THE PRIMARY SYSTEM ACROSS CHAUNCY TO THE MALL IS DEPENDENT UPON CHAUNCY-ARCH STREET REALIGNMENT AND WIDENING SCHEDULING.

THE PRIMARY SYSTEM ITSELF ALONG SUMMER STREET CAN BE COMPLETED CONCURRENT WITH THE CONSTRUCTION OF PARCEL D1. UNTIL ARCH STREET IS REALIGNED, THE EXTENSION ACROSS SUMMER STREET CANNOT BE BUILT. CONSTRUCTION CAN PROCEED IMMEDIATELY WITH REALIGNMENT AND IS NOT NECESSARILY DEPENDENT UPON NEW CONSTRUCTION IN THAT PARCEL, -THE BRIDGE AND ACCESS ELEMENT LOCATING IN THE NEW SPACE FORMED BY THE REALIGNMENT. THE CITY SHOULD, HOWEVER, ADVISE AS TO THE KIND OF SIGHT LINES AND EXTENT OF ENCLOSURE OF ARCH STREET BY BUILDING FRONTAGE REQUIRED. IF BUILDING CLOSURE ALONG A REALIGNED ARCH STREET IS DESIRED, THIS BRIDGE (NO. 1 ON DIAGRAMS FOLLOWING) MAY (1) REQUIRE A TEMPORARY JUNCTION AT THIS CORNER, (2) WAIT UNTIL THE CORNER IS REDEVELOPED (3) BE DESIGNED IN A VERY PERMANENT SENSE ADMITTING THAT NEW CONSTRUCTION WILL BE SUBSEQUENT AND MAY NEED TO BE PHASED ABOUT IT. THIS BRIDGE WOULD DEPOSIT PEOPLE ON THE NORTH SIDE OF SUMMER STREET WHERE CROSSING TO THE MALL IS MORE DIRECT AND CLEAR. IT IS ASSUMED THAT A MAJORITY OF TRANSIT USERS, UNTIL THIS NEXT BRIDGE IS INSTALLED, WILL EXIT FROM THE PARCEL D1 STATION DIRECTLY WITHOUT CONFLICT WITH TRAFFIC. AN ALTERNATIVE ROUTE MAY BE OFFERED PEDESTRIAN PRIOR ERECTION OF THE SUMMER STREET BRIDGE VIA TRANSIT CONCOURSE IF THIS IS PUBLIC.

COMPLETION OF THE BRIDGE TO THE MALL AT THE CHAUNCY-ARCH INTERSECTION IS DEPENDENT UPON PROPOSED STREET RE-ALIGNMENTS AND PARCEL C-3 DEVELOPMENT.

SUPPORT OR RECEIPT OF A BRIDGE DIRECTLY TO THE MALL IS IMPOSSIBLE WITHOUT RE-ALIGNMENT OF CHAUNCY-ARCH; CROSSING SHOULD BE ACHIEVED IN 2 STEPS: [1] BRIDGE DIRECTLY CROSSING SUMMER STREET TO THE NORTH-EAST CORNER, AND THEN [2] A SECOND BRIDGE CONSTRUCTED OVER ARCH STREET TO THE MALL.

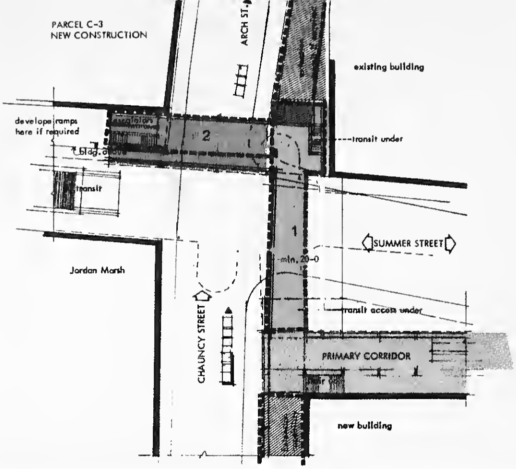
DIAGRAMS A, B AND C OPPOSITE ILLUSTRATE ALTERNATIVES FOR LOCATING THIS 2ND BRIDGE AND ITS PHASING RELATIONSHIPS TO THE INITIAL SUMMER STREET CROSSING.

DIAGRAM C CAN ACHIEVE A DIRECT BRIDGING FROM THE NORTHEAST CORNER WITHOUT REMOVAL OF THE EXISTING BUILDING IN PARCEL C-3, BUT IS DEPENDENT UPON STRAIGHTENING OF SUMMER STREET HERE TO INCLUDE A POSSIBLE POCKET PARK STRIP. DIAGRAM B RETAINS THE BEND IN SUMMER STREET, BUT RELIES ON RETAINING EXISTING CONSTRUCTION IN THE C-3 PARCEL, ERECTING A PERMANENT BRIDGE, WHICH MAY LATER BE RECEIVED UNDER AN ARCADE, BUT WHICH MAY TERMINATE IN A TEMPORARY OR PERMANENT ACCESS AT RIGHT ANGLES TO IT. DIAGRAM A DEPENDS ON NEW CONSTRUCTION IN PARCEL C-3.

DIAGRAM A IS PREFERRED DEPENDING UPON C3 DEVELOPMENT. IT IS MOST COMPLIMENTARY TO THE MALL AND PERMISSIVE OF RAMPING SHOULD THIS BE REQUIRED. DIAGRAM IS ALSO PERMISSIVE OF EXTENSION OF A2ND LEVEL WITHIN THE C3 PARCEL IF DESIRED. THE SAME POCKET PARK CAN BE ACHIEVED AT SUMMER STREET IF PROGRAMMED.

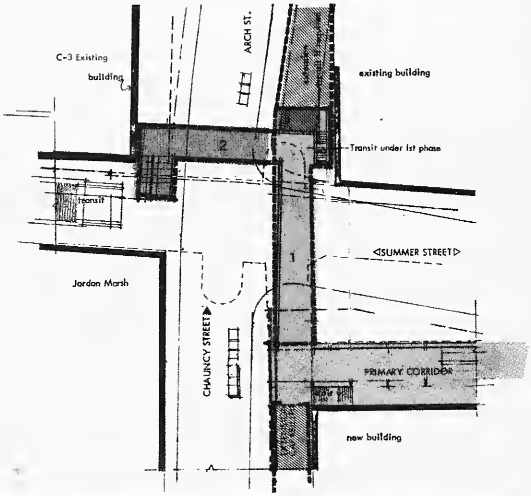
OTHER BRIDGE CONFIGURATIONS OR LOCATIONS WERE DISCARDED BECAUSE OF PHYSICAL CONSTRAINTS OR THEIR TENDENCY TO CONFUSE VEHICULAR SIGHT LINES, RELATIONSHIP TO THE MALL AND URBAN SPACE, AND EXTREME STRUCTURAL DEMANDS.

CHAUNCY-ARCH INTERSECTION



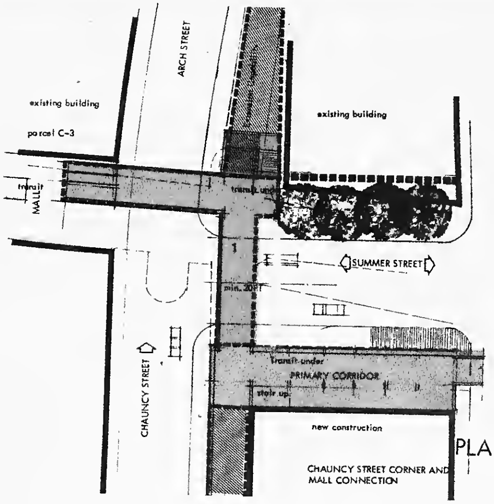
A

Diagram A: Dependent upon new construction in Parcel C3.



B

Diagram B: Same a s A but with access-egress to Arch Street bridge at right angles [acess temporary or permanent] without redevelopment of C3.



C

Diagram C: C3 retained by locating foot of Arch Street bridge in enlarged corner created by straightening Summer Street with possible park space at corner [possible Diagram A also].

PLATE 7-2

GENERAL:

R.O.W. CONSTRAINTS ARE DICTATED BY:

[1] MOVEMENT SYSTEM REQUIREMENTS FOR STRAIGHTLINE SEGMENTS AND CONTINUITY;

[2] ACCESS - EGRESS AND CONNECTION OR EXTENSION REQUIREMENTS;

[3] PLANNING OR DEVELOPMENT CRITERIA;

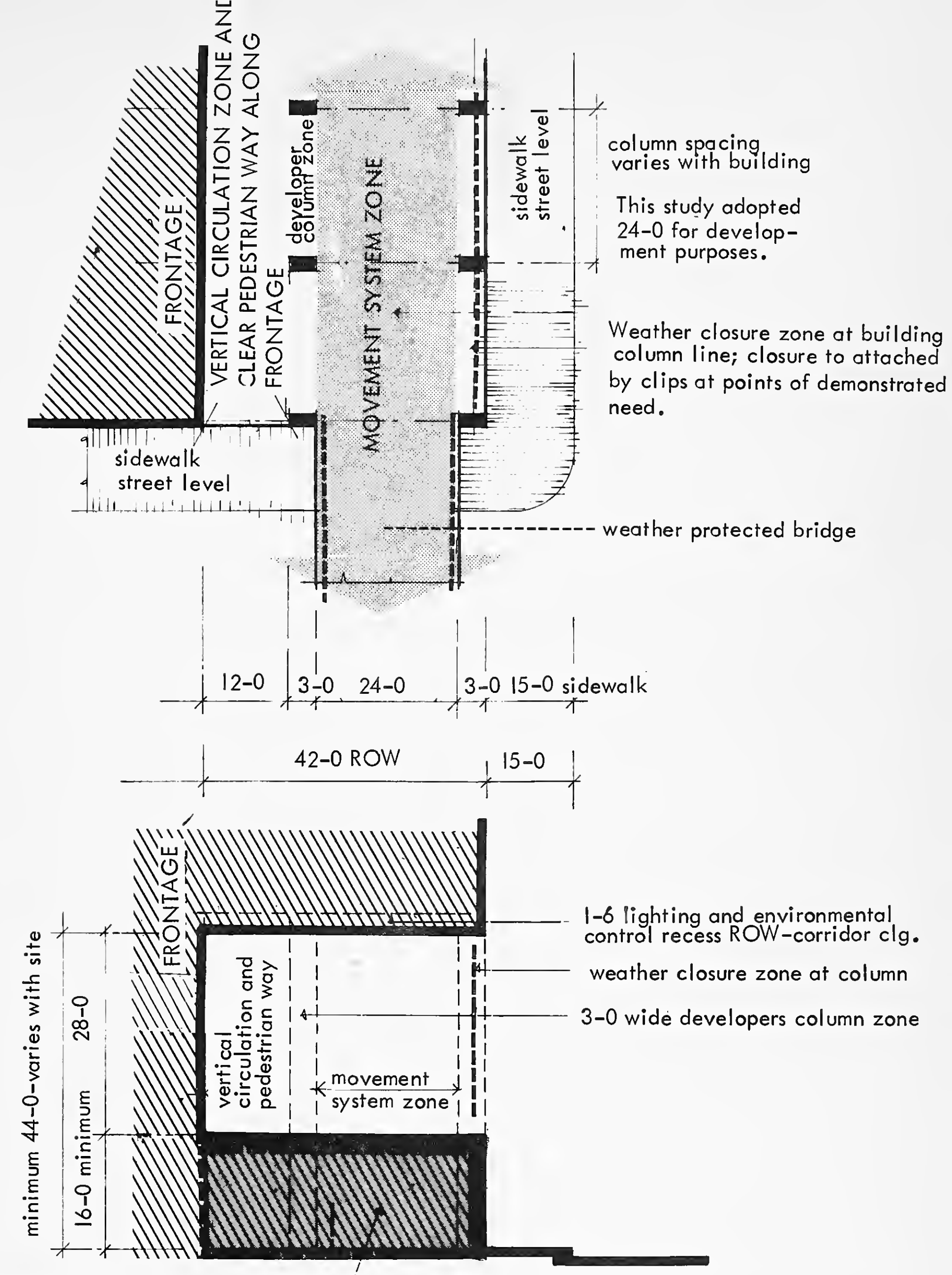
[4] PHASING VARIABLES.

CENTRAL MAINTENANCE AND MONITORING: Central Maintenance facilities are recommended in the parking structure segment of the South Station segment for the initial phasing schedule, service accessibility, and reasonably central location. This facility is recommended especially as planned in conjunction with the edge alignment and should receive special consideration by the architects of that building. In the event the South Station segment is not scheduled for first construction, parcel D-7 is recommended as an alternate.

R.O.W. DIMENSIONS:
Horizontal R.O.W. (40'-0" to 44'-0" width): Final definition of horizontal R.O.W. is dependent upon (1) selection of movement system and its exact width requirements, and (2) final proposal for structural connections between column R.O.W.s to receive bridges. (See Plate 5D-3) This report develops a 42'-0" R.O.W. based on information available at this time.

Vertical R.O.W. and Elevation of Pedestrian Level: Vertical elevations in the corridor are dependent upon (1) final selection of movement system type, (2) requirements for service access (e.g., tunnel) under the movement system at 2nd level, (3) site context; and

Note: If developers columns require more than the 3-0 depth of the column ROW, this difference should be taken to left and right of the Movement System ROW, extending into the sidewalk and increasing the total ROW on the frontage side as necessary while maintaining the 12-0 clear pedestrian walkway.



Corridor ROW at Street Level:

Machine Rooms and Transformer Rooms
Corridor Access Stairs and Escalators
Service Tunnel or Access to System above
Transit Stations
Frontage and/or arcades

R.O.W. DIAGRAM- PART
PLAN AND SECTION

PLATE 7-3

(4) final definition of structural depth for spanning bridges at streets. A clearance of 14'-6" must be maintained under bridge structure at streets.

Vertically, elevations are initially constrained by the height of the prime pedestrian generator at one end, the Transportation Center concourse level, and by the 14'-6" clearance for trucks at the Chauncy street end. Elevations are further discussed under 'Corridor Planning.'

PARCEL GUIDELINES: PRIMARY CORRIDOR: See drawings for a tabulation of Corridor elements: stairs, bridges, etc., and their relationships, critical dimensions, and clearances. Phasing and scheduling information for each parcel must follow from final design. Although each development parcel may have different structural concepts, the relationships of elements must be respected. Stairs must orient in the manner indicated. The design proposal developed in this report is essentially a set of relationships, but sizes and planning aspects should be respected, subject to review and coordination.

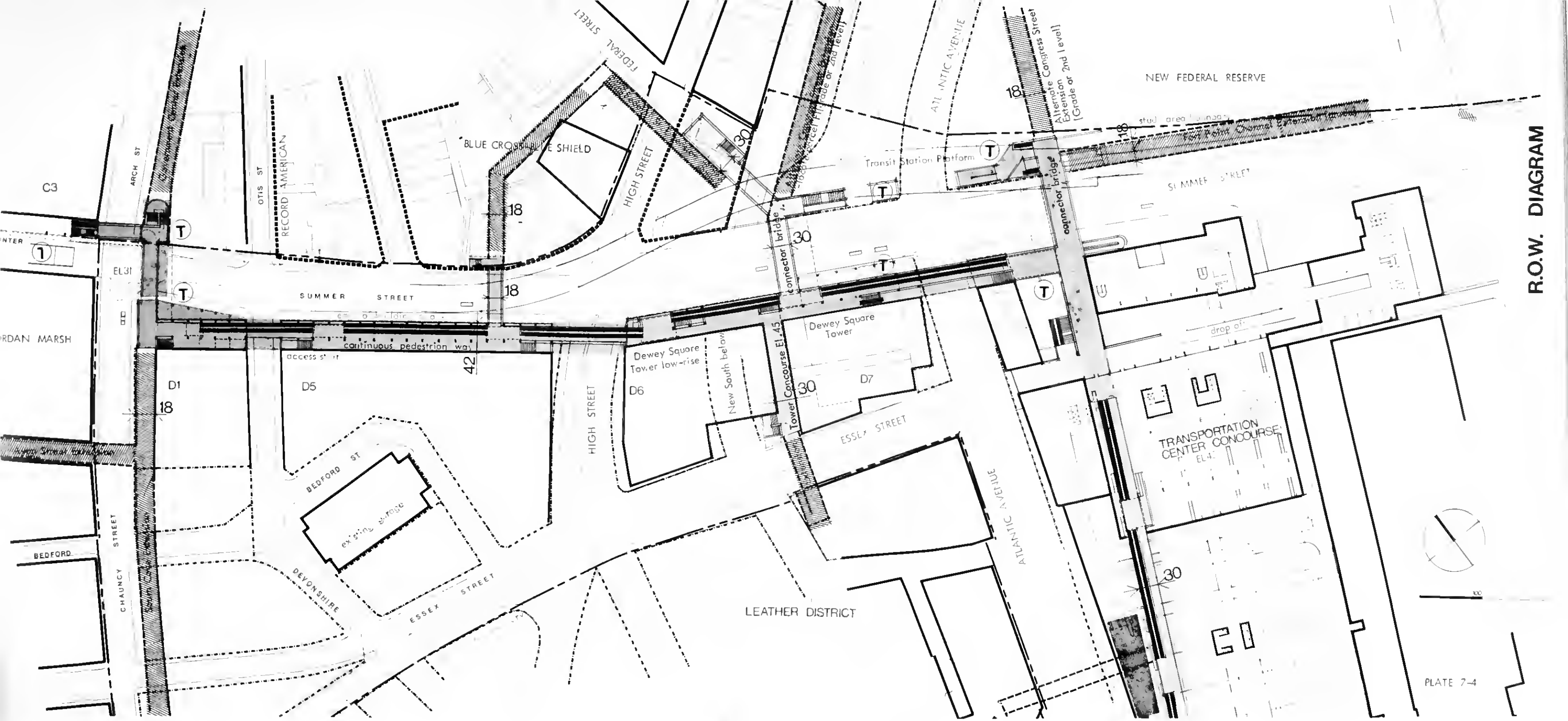
CONSTRAINTS FOR PARCELS ABUTTING OR ACROSS FROM THE PRIMARY CORRIDOR: In addition to Parcels falling within the Primary Corridor routing from the Mall to the Transportation Center, those falling on the North of Summer Street should anticipate the following general planning constraints. Corridor extension should be consistent in all ways with the Primary Corridor; all objectives, criteria or design constraints apply. The City must determine the extent of jurisdiction it wishes to exercise on 2nd level pedestrian networks, however. It is recommended that the Federal Street extension thru Parcel F-2 be included within this jurisdiction -- and the Blue Cross-Blue-Shield Parcel be examined. Corridor jurisdiction at the Blue Cross-Blue Shield must nevertheless here include the connector bridge and its access element at such time as it is implemented. All extensions should be subject as public ways to City review.

PARCEL F-2 GENERAL CONSTRAINTS: It is recommended that building mass on this parcel be permitted to extend to all property lines, holding a clear vista the equivalent of Corridor height (28-0) thru the building at Corridor level on the axis of Federal Street toward Summer Street, the width of Federal Street. It is presently proposed that a pedestrian connector bridge be provided between Parcel F-2 and the Federal Street - High Street corner opposite. This bridge is seen as complimentary to pedestrian service but not specifically required. Development of a more extensive access to the Corridor Level within Parcel F-2 between grade and the Corridor level may both present a more viable development alternative to that Parcel, respect phasing, and create a stronger connection to the Corridor, collecting in a more forceful manner users generated along High Street and upper Congress.

(1) Corridor R.O.W.: 24-0 clear between the Federal Street corner north of High Street in line with the axis of Federal Street at the 2nd level carrying pedestrians by foot from access on the far side of High Street at Federal thru to Parcel F-1, bridging across Purchase Street;

(2) Bridge Clearance: 14'-6" clearance must be be maintained over all streets and the design and character of the R.O.W. correspond with Corridor criteria. Corridor elevation must conform to that at the inception of the bridge in parcel D6 (El. 45'-0" presently);

(3) Corridor Height: A minimum 28'-0" above the floor of the pedestrian way, subject to review


R.O.W. DIAGRAM
NEW FEDERAL RESERVE
BLUE CROSS BLUE SHIELD
SUMMER STREET
continuous pedestrian way
Dewey Square Tower low-rise
Dewey Square Tower
Tower Concourse EL 45
New South below
connector bridge
Transit Station Platform
TRANSPORTATION CENTER CONCOURSE
drop off
HIGH STREET
ATLANTIC AVENUE
ESSEX STREET
LEATHER DISTRICT
BEDFORD ST
DEVONSHIRE
existing garage
CHAUNCY STREET
BEDFORD
ARCH ST
OTIS ST
RECORD AMERICAN
FEDERAL STREET
JORDAN MARSH
C3
D1
D5
D6
D7
EL31
access stair
Alternate Congress Street Extension [Grade or 2nd level]
18
30
42
PLATE 7-4

(4) Access: At least l access must be provided to the pedestrian way within this block, positioned in a legible way and complementary to those which will be found in the High-Federal Street terminus and the Purchase Street bridge connection. More extensive access than typically indicated for the primary Corridor may be provided at the developer's discretion;

(5) Environmental control and lighting: Conform to requirements for the primary Corridor. This extension should conform in all ways to requirements developed for the Primary Corridor.

PARCEL F-l: GENERAL CONSTRAINTS:
Constraints are similar to those for F-2. One access element, clearly and legibly located with its orientation toward a new transit station on the Atlantic Avenue - Summer Street corner must be provided. Support for receipt of 2 bridges must be provided. Bridge location presently appears to be a function of coordination between Parcels F-2, F-l and D-7, Dewey Square Tower. A straight and clear R.O.W. is mandatory, as the extension is expected to carry a considerable volume of Federal Street users. As has been recommended in Section 5A, the parcel has considerable potential for developing a clear R.O.W. north to Congress Street and should include in its planning such a public way, connecting readily to the transit station and Corridor.

BLUE CROSS - BLUE SHIELD:
(l) Federal Street Extension: One typical access element and a Connector bridge must be received at the Federal Street - High Street corner; dependent upon the City's final committment on bridging to that site from Parcel F-2.
(2) One typical access element and connector bridge should be received from the primary Corridor itself on Summer Street (see plan). The developer of this parcel is encouraged to extend this connection thru to Federal Street ensuring accessibility of that District to the Corridor and serving that Parcel.

FEDERAL RESERVE PARCEL: [See Section 5A]:
This parcel must receive a major connector bridge from the Transportation Center at approximately El. 45-0, and provide clear and legible connection by stair and escalator between bridge, grade and a new transit station. Exact position must be a function of coordination between the architects of this parcel and of the Transportation Center. The exact elevation is subject to Transportation Center planning development.

A clear pedestrian way should be permitted to Congress Street from this bridge if it cannot be incorporated in Parcel F-l adjacent, and a major pedestrian gesture at grade or 2nd level of approximately 28-0 min. be permitted toward the Channel alongside Summer Street. Special consideration should be given the design and integration of the terminus of the Connector bridge with the Transit and Federal Reserve Plaza level.

LEATHER DISTRICT EXTENSION: The block opposite the Dewey Square Tower on Essex Street should look toward receiving a connector bridge and access stair from the concourse of that building, conforming with overall Corridor design criteria.

GENERAL: COSTS HAVE BEEN DEVELOPED ON A MODULAR BASIS FOR THE SUMMER STREET CORRIDOR SEGMENT ACROSS TO THE FACE OF THE TRANSPORTATION CENTER. THEY ARE PRELIMINARY ONLY, SUBJECT TO THE PRESENT PLANNING VARIABLES, AND ARE INTENDED TO SERVE AS AN ASSISTANCE IN DECISIONS REQUIRED FOR THE FINAL PRELIMINARY DESIGN PHASE. COSTS ARE TO JAN. 1971 (CONSIDERATION TO INCREASED STRUCTURAL LOADS TO DEVELOPERS ARE NOT INCLUDED).

MODULE ELEMENTS:

TYPICAL MODULE - 2ND LEVEL (24 X 40 FT): (Includes finishes, fill, ceiling lighting and environmental control, movement system balustrade lighting, floor structure and service tunnel at movement system clear R.O.W., balustrades, movement system closure panel.)

TOTAL $23,788.00

TYPICAL CORRIDOR ACCESS STAIR: (Includes finishes -- masonry landing, balustrades, granite treads, masonry closure at machine room, wall lighting and environmental control panel, steel handrails.)

TOTAL $18,585.00

MACHINE ROOM (20 X 30 FT): (Supplementary lighting, floor and support for bridges, ventilation louvers, access, louvers and street closure panels.)
(Ventilation is covered under Bridge Type C)

TOTAL $13,364.00

TRANSFORMER VAULT (10 X 20 FT): (One per terminal -- similar to Machine Room)

TOTAL $4,429.00

BRIDGE TYPE A: PEDESTRIAN ONLY (20 X 90 (Includes finishes, balustrades, structure, snow melting, drainage, gutter, setting bed, pumps, continuous lighting under balustrades.)

TOTAL $64,282.00

BRIDGE TYPE B (22 X 90 FT): MOVEMENT SYSTEM PLUS PEDESTRIAN THRUWAY: (Includes precast balustrades, structure, pavers, and fill, closure panels, ventilation and comfort heating, barrel vault closure, lighting at system and bridge balustrades.)

TOTAL $119,269.00

BRIDGE TYPE B (22 X 120 FT): MOVEMENT SYSTEM PLUS PEDESTRIAN THRUWAY: (Similar to above but longer.)

TOTAL $196,890.00

2ND LEVEL MOVEMENT SYSTEM TERMINAL (2 BAYS): (Includes lighting and environmental control, finishes, fill, balustrades, tunnel and structure at movement R.O.W. below.)

TOTAL $42,134.00

Note: Ceiling finish is responsibility of the developer but recommendations regarding colour and surface will be delineated. Recesses must be provided to receive bus ducts and lighting-environment units.

SUMMARY: SUMMER STREET SEGMENT ONLY, TERMINATING 100'-0" INTO THE TRANSPORTATION CENTER, AND INCLUDING BRIDGE CONNECTION TO THE MALL: (Note: R.O.W. width assumed at 40-0 pending final selection of movement system and bridge structure):

2ND LEVEL MOVEMENT SYSTEM -- ALIGNMENT ALTERNATE I

TYPICAL MODULE	33 @	$23,788.00	$785,004.00
TYPICAL ACCESS ELEMENT (Includes access at Mall and Essex Street-Concourse)	10 @	$18,585.00	$185,850.00
MOVEMENT SYSTEM TERMINALS (Note: Cost is for architectural and structural only, excluding movement system)	6 @	$42,134.00	$252,804.00
DEWEY SQ. TOWER CONCOURSE (40-0 width) (Paving and environmental)			$ 55,640.00
BRIDGES: TYPE A (90 ft.)	2 @	$64,282.00	$128,564.00
TYPE B (90 ft.)	1 @	$119,269.00	$119,269.00
TYPE B (120 ft.)	2 @	$196,890.00	$393,780.00
ESCALATORS	5 @	$48,150.00	$240,750.00
MACHINE ROOMS	10 @	$13,364.00	$133,640.00
TRANSFORMERS	5 @	$4,429.00	$ 22,145.00
		TOTAL	$2,317,486.00

EXTENSIONS: Extensions from the primary Corridor have been calculated separately, and may be added to the above cost, yielding a total of $2,965,558.00. No allowance for escalation beyond January 1971 or fees is included. The orientation system including terminal housing, but excluding its environmental control, has been itemized in Section 8. This figure should be added to overall Corridor costs.

Central control and maintenance facilities, should phasing preclude their inclusion in the Transportation Center Segment, will need to be added to this section. For estimating purposes pending final programming, assume 2000 square feet or approximately $60,000.00, integrated with Transportation Center or contextural structure.

FEDERAL STREET EXTENSION: (PARCELS F1 AND F2):

BRIDGE: TYPE A (90 ft.) (ped. only)	3 @	$64,282.00	$192,846.00
TYPICAL ACCESS ELEMENT (more general access should be subsidized by developers)	3 @	$18,585.00	$ 55,755.00
TYPICAL MODULE	4 @	$23,788.00	$ 95,152.00
		TOTAL	$343,753.00

BLUE CROSS - BLUE SHIELD DEVELOPMENT: BRIDGE AND ACCESS ONLY:

BRIDGE: TYPE A (90 ft.)	1 @	$64,282.00	$64,282.00
TYPICAL ACCESS ELEMENT	1 @	$18,585.00	$18,585.00
		TOTAL	$82,867.00

FEDERAL RESERVE PARCEL:

BRIDGE: TYPE A (90 ft.)	1 @	$64,282.00	$64,282.00
TYPICAL ACCESS ELEMENT (Double Module Size)	1 @	$37,170.00	$37,170.00
ESCALATORS (24'-0" long):	2 @	$60,000.00	$120,000.00
		TOTAL	$221,452.00

FEDERAL RESERVE PARCEL: This connection is so integrally related to Transportation Center planning that an exact figure will be dependent upon its final design and coordination with the Federal Reserve Parcel. For purposes of this report, the bridge has been indicated at Concourse El. 45. It may be lowered to El. 36 with proper planning, thereby reducing escalator runs; however, ramping may then be necessary. In the event the Summer Street Segment is completed before the Transportation Center, a support system may have to be devised. It is recommended that this be avoided, and the Summer Street Segment system completed for operation only to the Federal Street Bridge (collecting Transit generated users at this point), with phasing of the Atlantic Avenue bridge only after readiness of the Transportation Center. The figure above is included only as an approximation of that section's cost. Ramping has been assumed so integral with Transportation Segment planning as to belong with its cost and implementation.

GENERAL: It is recommended that maintenance criteria be established for the Corridor as a whole. Engineering consultants have suggested a clear program for the maintenance and freedom from corrosive materials, trash, etc. can contribute to the movement system's best operation.

It has been the intent of design development to assume a permanent character relative to materials, and exert choices in such ways as to minimize maintenance required over a period of time, vandalism and replacement.

Maintenance of the entire corridor by one party is advised as a city responsibility rather than dependence upon abutting occupants: 1) to meet public safety needs; 2) to optimize movement system performance.

Every effort will be made to minimize maintenance requirements.

CENTRAL MAINTENANCE FACILITY: A Central Maintenance Facility for the movement system is proposed in the transportation center (see 'Corridor Planning'). This facility might be expanded to include corridor maintenance when jurisdiction and implementation are determined.

Location in the transportation center is considered valid for the same reasons as for the central movement system control.

RECOMMENDATIONS: In addition to a Central Maintenance Facility, it is recommended that custodial and janitorial capabilities be added to include signs, general maintenance, repairs, lighting upkeep, etc.

Legal Aspects: Numerous legal requirements need to be considered before a facility such as a public corridor and moving walk system is implemented. Legal considerations regarding authority to build and operate a moving walk, liability, security and the like have been studied by Ely, Bartlett, Brown and Proctor, legal counsel to the BRA, and additional research is certain to be undertaken on these concerns during the remainder of the CADS study.

Legal aspects of contract relationships and construction scheduling, responsibilities, and constraints will become important as the sequence of construction becomes clear and final design requirements are established.

Structural design of the building contexts through which the corridor passes will have to accommodate the superimposed loading from the moving walk system, the pedestrian ways, bridges and access points. Constraints on parcel developers must include final loading data caused by the system, and be accepted by the developer at the outset so as not to subject his architects and engineers to re-design.

If a parcel is developed in such phasing sequence that the moving walk is not installed immediately, but a 2nd level pedestrian concourse is constructed with capacity to receive the system as an interim phase, a series of legal and economic questions are raised:

[1] The building must be structured to receive the moving walk;

[2] 2nd level commercial frontage may require stair and escalator access immediately. Responsibility for payment for public stairs, paving surfaces, lighting, needs to be clearly established for parcels in all stages of construction or development. In detail, to what extent does the developer accept the cost of corridor elements and finishes; -does his contractor provide them, and the nature of agreement between contractor and BRA require definition so that such work can be paid for by the City.

Bidding requirements and overall construction continuity need to be examined. Guidelines will assist in final design and establishing costs.

Such considerations should be reviewed at the earliest possible date so as to clarify final design criteria and scope, and reduce confusion and delay in the construction period.

General: Connections between the transit system and corridor are of prime importance in implementing CADS and corridor objectives. These connections must be direct and pedestrian movement assisted with elevators or escalators as necessary. This is especially important as the role of mass transit can only increase in the years to come. Terminals housed within permanent structures should be carefully assessed as to their volume capabilities.

MBTA Access - Chauncy Corner and Winter Street Mall: There is potential for connecting the proposed new mall with the transit concourse level below, and via extension of this concourse east under Summer Street, to provide a new station at the Record American Devonshire Parcel, better serving the financial district pedestrian. Relocation of stations at Arch-Summer and Chauncy-Summer corners would be required with proposed street realignments.

The Chauncy-Summer terminal should be regarded as a major pedestrian generator, and prime connection to the second level pedestrian corridor be achieved prior to the proposed Chauncy-Arch realignment and completion of the mall bridge. When completed, it is expected that, with the development of a major transit concourse interfacing with the mall, this bridge would serve a majority of east bound pedestrians originating from the more public mall-transit interface.

Examination of the platform and connection-transfer needs indicates that a major public concourse under the mall and extended to the east of Chauncy would not necessarily require turnstiles or controls at all access points, but could incorporate a centralized turnstile area at the mall permissive of transfers but allowing the frontage and activities of the concourse to become 'public' and an

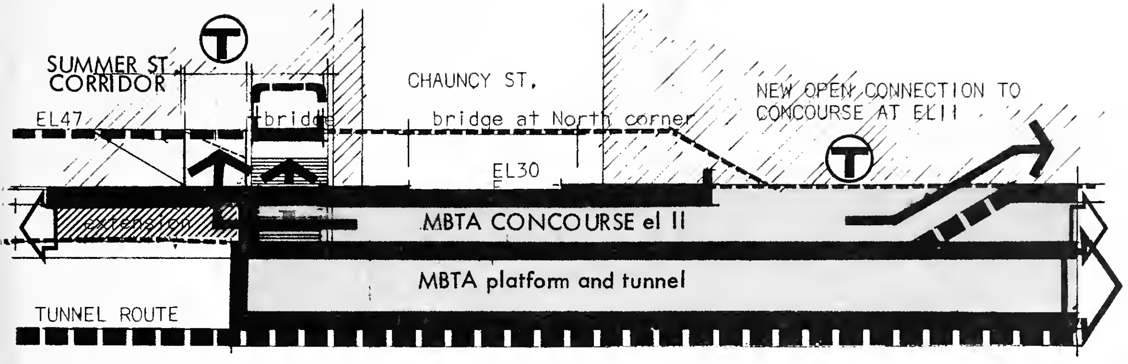
extension of the mall itself. This would be permissive of and implement pedestrian flow from a corridor terminating at Chauncy prior the completion of the mall bridge as an alternative to crossing the street - a major north-south distributer. Major interface and openness to the proposed mall would do much to improve the attractiveness and importance of the transit concourse.

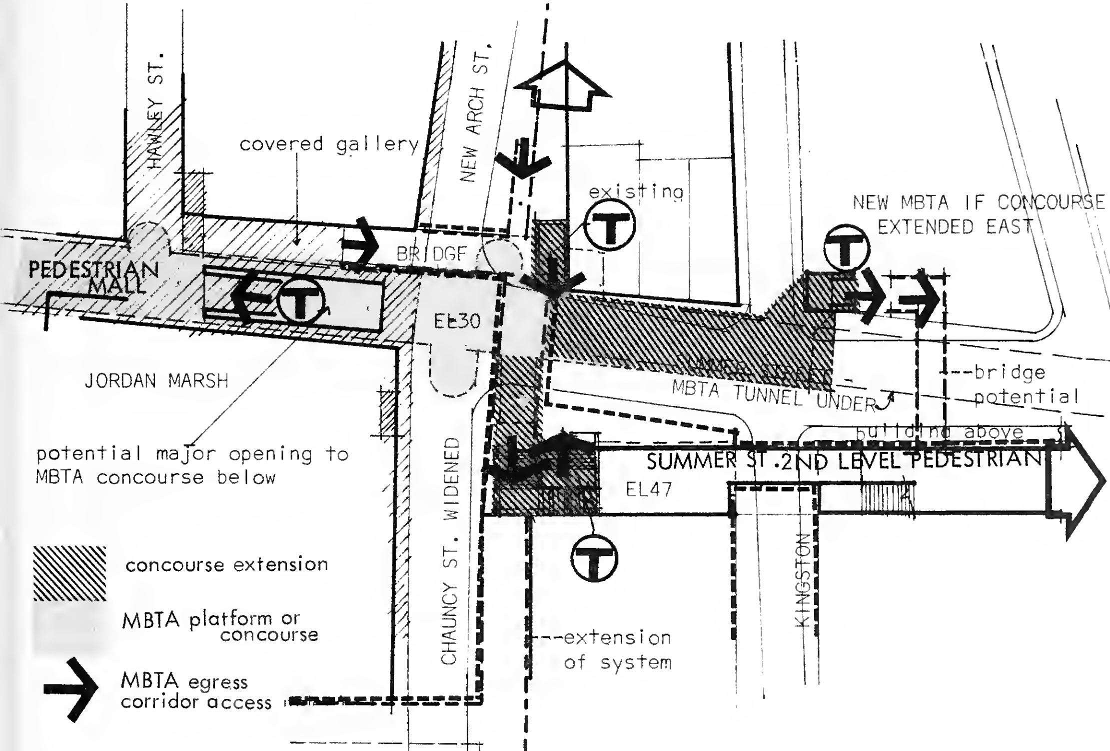
A pair of elevators should be considered connecting transit and corridor.

MBTA Access - Devonshire: This new transit location at Devonshire in the Record American block suggested by the MBTA would be consistent with their policy of "extension"; a decided courtesy to the user, but possibly redundant due to its proximity to the Arch-Summer terminal which can serve the same general user and area.

A bridge between this station and the corridor has been indicated, but would be a convenience at best and not at all essential as pedestrian destinations served by such a station lie in a relatively small area to the north [traffic directed to the heart of the financial district is not likely to negotiate the maze of streets served by this station]. If, however, a developer of this parcel desired a connector bridge, a normal connection point could be established, -but it should be noted that exact location of such a bridge would be dictated by the column structure of the corridor and any frontage on this particular site would be seriously limited and dominated by transit station access and corridor access. A prototypical corridor bridge access element has been developed which minimizes frontage impact and can incorporate a transit terminal. The bridge itself can serve as the orientation device identifying a mid-block access to corridor and transit.

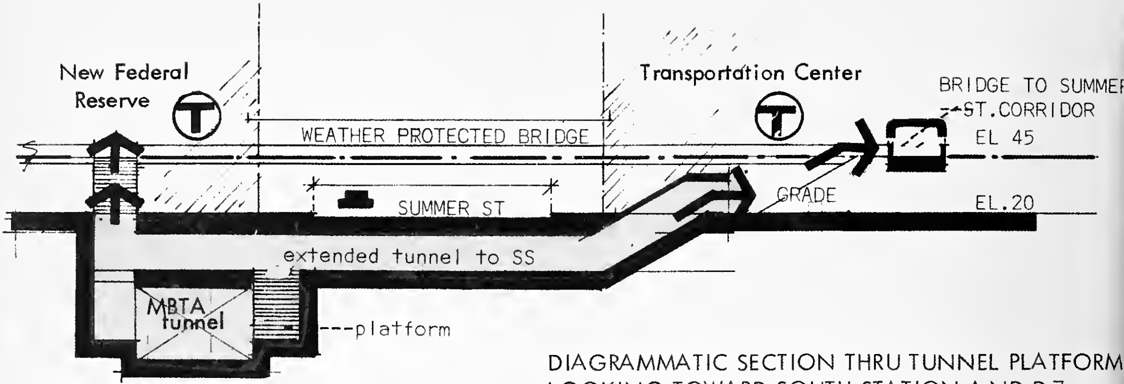
MBTA Access - Transportation Center: Realignment of Summer Street at Atlantic Avenue affects present location of MBTA stations. Required relocations should be coordinated to connect with the new pedestrian system and the transportation center concourses [see South Station]. It is suggested that new terminals integrate with new building construction in order to take advantage of weather protection afforded by their cover and establish continuity with the corridor. Pedestrian connections should be as direct as possible and should include escalators. The under-street tunnel between station and the transportation center and corridor should be given special consideration with respect to character and capacity as mass transit volume must definitely increase at such an important connection. The MBTA could lend special character, sense of place and interest, possibly introducing natural light and openness to platform levels through coordination with new construction above.





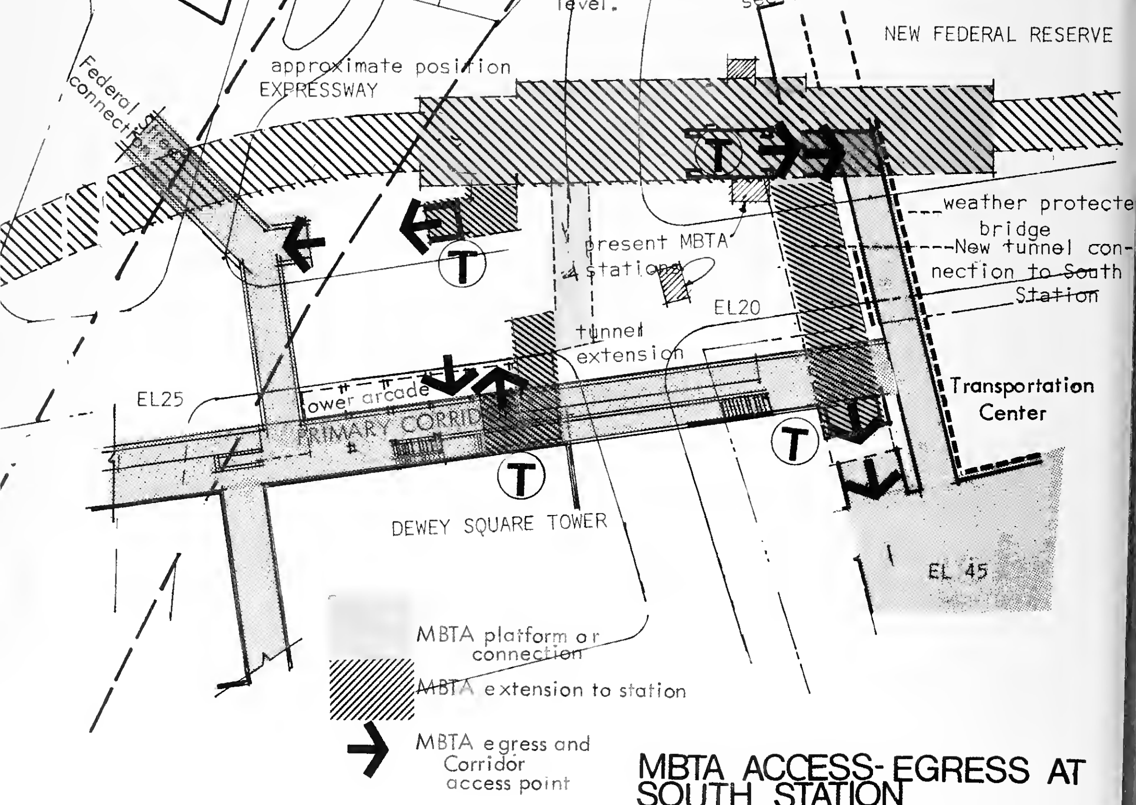
MBTA ACCESS-EGRESS AT CHAUNCY-ARCH

PLATE /-5



DIAGRAMMATIC SECTION THRU TUNNEL PLATFORM LOOKING TOWARD SOUTH STATION AND D7

Note: 4 MBTA [transit] stations should be developed at the Atlantic Avenue-Summer Street intersection with the relationships to the Corridor and the corner where located as indicated in the plan diagram. Escalators should be installed at all but the Northwest corner [parcel F-1] between grade and Corridor or bridge level.



MBTA ACCESS-EGRESS AT SOUTH STATION

PLATE 7-6

Section 8 CORRIDOR ORIENTATION SYSTEM (GRAPHICS)

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Section 8 — Corridor Orientation System (Graphics)

SCOPE: THIS SECTION DEVELOPS PRELIMINARY PLANS, DRAWINGS AND WRITTEN MATERIAL FOR THE INFORMATION AND ORIENTATION GRAPHICS FOR THE AREA OF THE MOVING SIDEWALK, INCLUDING A LOGO; DESIGN OF ALPHABET AND NUMBERS IN TERMS OF SIZE, PROPORTION AND COLOUR AND MATERIALS: ALERT OR WARNING DEVICES; SIGN POSITIONING, SIGN MESSAGES; SIGN LIGHTING; AND ESTIMATED COSTS.

APPROACH: THE NATURE OF THE PEDESTRIAN CORRIDOR, ITS COMMUNICATIONS REQUIREMENTS AND THE IMPACT OF VISUAL COMMUNICATIONS DEVICES AND MEDIA UPON CORRIDOR CHARACTER AS A WHOLE HAS SUPPORTED A COMMUNICATIONS SYSTEM APPROACH, DIRECTLY INTEGRATED WITH CORRIDOR DESIGN.

SUCH AN INTEGRATIVE APPROACH SHOULD GREATLY OPTIMIZE THE EFFECTIVENESS OF CORRIDOR COMMUNICATIONS MEDIA, TRAFFIC FLOW, SAFETY AND PEDESTRIAN CONVENIENCE, IN ADDITION TO ENHANCING THE OVERALL CORRIDOR ENVIRONMENTAL EXPERIENCE.

THE APPROACH, BASED UPON ESTABLISHING AND IDENTIFYING A COMMUNICATIONS SYSTEM, ENTAILS DEVELOPMENT OF A SET OF CRITERIA APPLICABLE TO THE VARIABLES EXPECTED WITHIN SYSTEM PLANNING, ESTABLISHMENT OF GUIDELINES OR DEPARTURE STANDARDS FOR CHANGES AND ADDITIONS, DEFINITION OF THE PROBLEMS AT VARIOUS POINTS, IDENTIFICATION OF DIFFERING NEEDS OF SYSTEM USERS, AND THE CORRIDOR AS A WHOLE. THE STUDY INCLUDES ESTABLISHING STANDARDS FOR LOCATION, SIZE, RELATIVE TO PRESENT AND FUTURE INSTALLATION NEEDS, AND OF DESIGN STANDARDS FOR CONTINUITY.

THE STUDY RESULTS IN A PRELIMINARY

'FRAMEWORK' OF COMMUNICATIONS NEEDS WHICH CAN BE MODIFIED OR AMPLIFIED AS NECESSARY, AND SHOULD BE RE-EXAMINED AT SUCH TIME AS ACTUAL CORRIDOR DESIGN IS COMPLETED. PLANNING IS INTENDED, HOWEVER, TO ANTICIPATE MOST CONDITIONS, EXCEPTING SPECIFIC MESSAGES AND EXACT SIZE OF TYPEFACE, FOR WHICH CRITERIA MUST BE ESTABLISHED.

CONDITIONS ENCOUNTERED WITHIN THE CORRIDOR PROPOSAL APPEAR PROTOTYPICAL AND COMMUNICATIONS SOLUTIONS COULD BE APPLIED TO VARIATIONS OF CORRIDOR DESIGN SHOULD FINAL DESIGN DICTATE.

<u>TYPEFACE:</u> THE CORRIDOR TYPEFACE HAS BEEN LINKED STRONGLY WITH TRANSIT GRAPHICS IN ORDER TO RELATE THE MOVEMENT SYSTEM MODES AND CAPITALIZE UPON THE APPROPRIATENESS OF THAT TYPEFACE TO A SURFACE PEDESTRIAN DISTRIBUTION SYSTEM. ALTHOUGH THE CORRIDOR COMMUNICATIONS SYSTEM CAN BE CONTAINED WITHIN ITS PARAMETERS, THE IMPORTANCE OF ESTABLISHING A RECOGNIZABLE CONTINUITY OF PEDESTRIAN COMMUNICATIONS NETWORKS MUST BE EMPHASIZED.

<u>TRANSPORTATION CENTER:</u> EXACT COMMUNICATIONS NEEDS AT THE TRANSPORTATION CENTER WILL BE DEPENDENT UPON DESIGN DEVELOPMENT OF THAT SECTION OF THE STUDY. AT PRESENT, IT APPEARS THAT NEEDS ARE VERY SIMILAR TO THOSE OF THE CORRIDOR AND MAY BE GROUPED IN THE SAME MANNER, E.G., 'TERMINAL,' 'ACCESS,' ETC.

Description of Task: The graphics study following was conducted as part of the larger study examining the feasibility of a system of moving walks as a pedestrian distributing mode within the Summer Street area of the Central Business District. It has as its objective the development of a communications system, and determination of the most appropriate information and orientation graphics for the pedestrian corridor outlined in the body of this report.

Study Area: The graphics study was concentrated on the Summer Street corridor segment. Examination of the Transportation Center Segment with its alternates suggests that its needs are similar with the exception of messages and specific design development, and can be dealt with on a grouping or situational basis. Sign illumination will be very different for an interior corridor alignment, if implemented, than for an edge alignment, - and colour would play a more extensive role than at the Summer Street segment in identifying terminals.

Several Summer Street alignment alternates and variables were examined during the course of the overall study. The graphics portion concentrated on Alternate 1 - 'Straight Alignment' as being most probable of selection for final development. Conditions encountered within it, however, appeared prototypical, and communications solutions developed for it could, with proper consideration of criteria, be adapted to alternate proposals.

Scope of Work: The graphics study was conducted in 2 phases which are summarized in this section:

[1] Preliminary: Outline of requirements and Preliminary Proposals, including: Preparation of preliminary plans, drawings and supporting written material for the information and orientation graphics for the area of the moving sidewalk including a symbol or logo; design of alphabet and numbers in terms of size, proportion, colour and materials; alert or warning devices; sign positioning; sign messages; sign brightness and lighting; and estimated costs.

[2] Final Preliminaries: Preparation of final preliminary plans, drawings and supporting written materials including but not limited to the items above.

Approach: The nature of the pedestrian corridor, its communications requirements and the impact of visual communications devices and media upon corridor character as a whole, strongly suggested a communications systems approach, integrated with corridor design as a whole.

It entails establishing and identifying a communications system, the various sub-groups of information or communications needs and their relationships, development of a set of criteria applicable to the variables expected within systems planning, development of guidelines or standards as points of departure for accommodating future changes and needs, definition of problems at various points, and identification of the differing needs of system users and the corridor as a whole. Its purpose is to optimize the effectiveness of corridor communications media, traffic flow, safety, and pedestrian convenience. The study includes standards for location, size, specific dimensions and criteria to ensure a practical and responsive system capable of meeting immediate and changing needs.

Communications - General: The purpose of communications devices is essentially to attract attention, convey information, and/or instructions relevant to the design process, orientation, or direction. Such a process need not necessarily be best achieved only through graphic or written means. It is imperative that the corridor be examined with the intent of determining the exact need, message, transmittal means and appropriateness of media to message.

Much can be realized through proper planning and design development of the context itself, eliminating or minimizing the need for evident communications devices - integrating orientational and decision processes within the development of a total environment. Corridor planning has achieved this to a considerable degree, and orientation requirements are relatively simple.

Corridor Continuity and Environment: Certain 'messages' need not be written. They are intentionally obvious, eg.- stairs and bridges. For example, those that must be written exert a decided impact, and care must be taken in their deployment, their numbers minimized and positions controlled if it is important that a place have a sense of order and their messages be effective.

Literal content [the written message] exerts a special influence on the attention of the viewer. The eye has a special necessity to 'read', - oblivious to the 'form' of its surroundings. In addition, -literal content [the written message] destroys awareness of 'form'. Form establishes order, identity, character and sense of place. These effects become important and suggest that signing be limited and relevant to its purpose the more so as the corridor is serving the general public and introducing the additional perceptual considerations of the movement system.

Driver needs in freeway signing have been extensively researched and suggest that certain attentions are necessary to ensure that signing needs for the movement system respond to the range of visual and perceptual considerations introduced by motion and acceleration that the Jackson & Moreland reports outline.

It is important perceptually to limit activity within the visual field when communications needs are orientation or decision-making in nature.

These general considerations coupled with ordinary practice have generated the following objectives to assisting in developing a solution to corridor communications needs.

Information Graphics: Information graphics design has two primary objectives: [1] put the literal message across as directly as possible, and [2] devise a form suitable for the best expression of the message with respect to its content and context.

Two questions are posed to the reader: [1] Do you understand? [2] Will you respond? Satisfaction of these questions requires careful balancing and integration of content, context and appropriateness of use of the basic rules of perception.

Context-Constraints: The pedestrian Corridor presents special considerations as it will house visual media directed toward several purposes; those serving the pedestrian way and system, those identifying occupants, their advertisements, and miscellaneous signing, in addition to the usual activity of people and context.

The movement system and its pedestrian way will serve a general public with different needs and capabilities: the first time system user, returning user, habitue, the shopper, the very young, the very old, the walker, the infirm or physically or visually handicapped, the illiterate or non- English speaking.

Graphics requirements for the pedestrian way and movement system differ decisively from other communications which may occur within the corridor in the importance which must be placed upon direct and clear communications. As their primary objective will be attention-getting and orientation at decision points, these communications must not compete for attention with context, format or organization. To this end, general graphics constraints need be established for the overall Corridor to insure effectiveness of communications relative to a movement system and pedestrian way serving the general public, to implement traffic flow, and to insure continuity of Corridor character and identity in assisting its function.

Continuity: A recognizable content and format, in addition, will contribute significantly to distinguishing Corridor communications from other activities or media, and assist in establishing continuity of Corridor communications.

The following specific design objectives were established for perceptual or operational reasons, and guided design development:

Minimization: Minimization of use of graphics or written instructions wherever possible, relying upon contextural planning or non-verbal means.

Continuity and Uniformity: Each communication designed in context with those that have gone before so that continuity of the communications system is achieved throughout relatively long sections of corridor.

Decision Points: The user must not be expected to evaluate more than one decision alternative at any advance sign. At decision points, he must not be given new information about either the thru route, or turn-offs, etc. [He must be asked to make only one decision 'type' at a time; he must be given this information once.] Adequate preparation and sufficient advance notice must be provided for decision points.

Evaluation and Feedback: The system should be permissive of feedback and evaluation in order to establish the effectiveness of the system and initiate adjustments as necessary. This is important in order to adjust to our constantly expanding knowledge about human perceptual processes.

Flexibility: Adoption of modular planning and design techniques for the same reasons as apply to the rest of corridor planning: availability, flexibility and adaptability, maintenance and replacement of components, minimization of problems, allowance for change and addition.

Maintenance: Design for minimum maintenance, easy replacement of parts on a component and readily available basis. Materials and construction shauld be resistant to vandalism, breakage, discoloration, scratches and aging.

Positions: Sight lines must be taken into consideration and optimized for viewers and situations. Signs should be properly canted to accommodate distortion and be properly visible at distances appropriate to the function.

The Pedestrian: Media and messages must be directed toward the particular pedestrian type (walking or moving), and be anticipatory of the range of perceptual and physical limitations to be expected of the general public, e.g., age, colour blindness, near-sightedness, etc.

The Message: The nature of the communication should be considered in itself relative to the technique, the kinds of facts, and their relationships to each other. Understanding of the message must be direct and quickly effective in order to ensure correct and efficient responses.

Legibility: The relationship between height of numerals and letters, stroke widths, backgrounds, colour, and irradiation at various distances must be examined, especially with respect to movement system users, so that messages will be clearly understood within the time frames necessary for decision making. Signing must be equally effective both day and night.

Glare: Glare is a brightness condition which causes distraction, discomfort, or a reduction in visibility. Those conditions in the visual area directly associated with the source of light and its immediate surroundings are classified as causing 'direct glare'; those associated with visual tasks and their immediate surroundings are classed as contributing to 'reflected glare'. Glare should be considered in establishing light levels and background illumination standards to ensure visibility of messages seen against ends of corridors and streets or corridor brightness.

The eye is susceptible to glare in the zone from the line of sight, nearly horizontal to approximately 45 degrees above. The colonnade along the movement system route should assist considerably in protecting the viewer from glare distraction and in focusing his attention on terminals.

Human Factors Implications: Special consideration must be given to the abilities and limitations of human beings in performing various information functions, such as receiving, storing, retrieving (recalling), processing and transmitting.

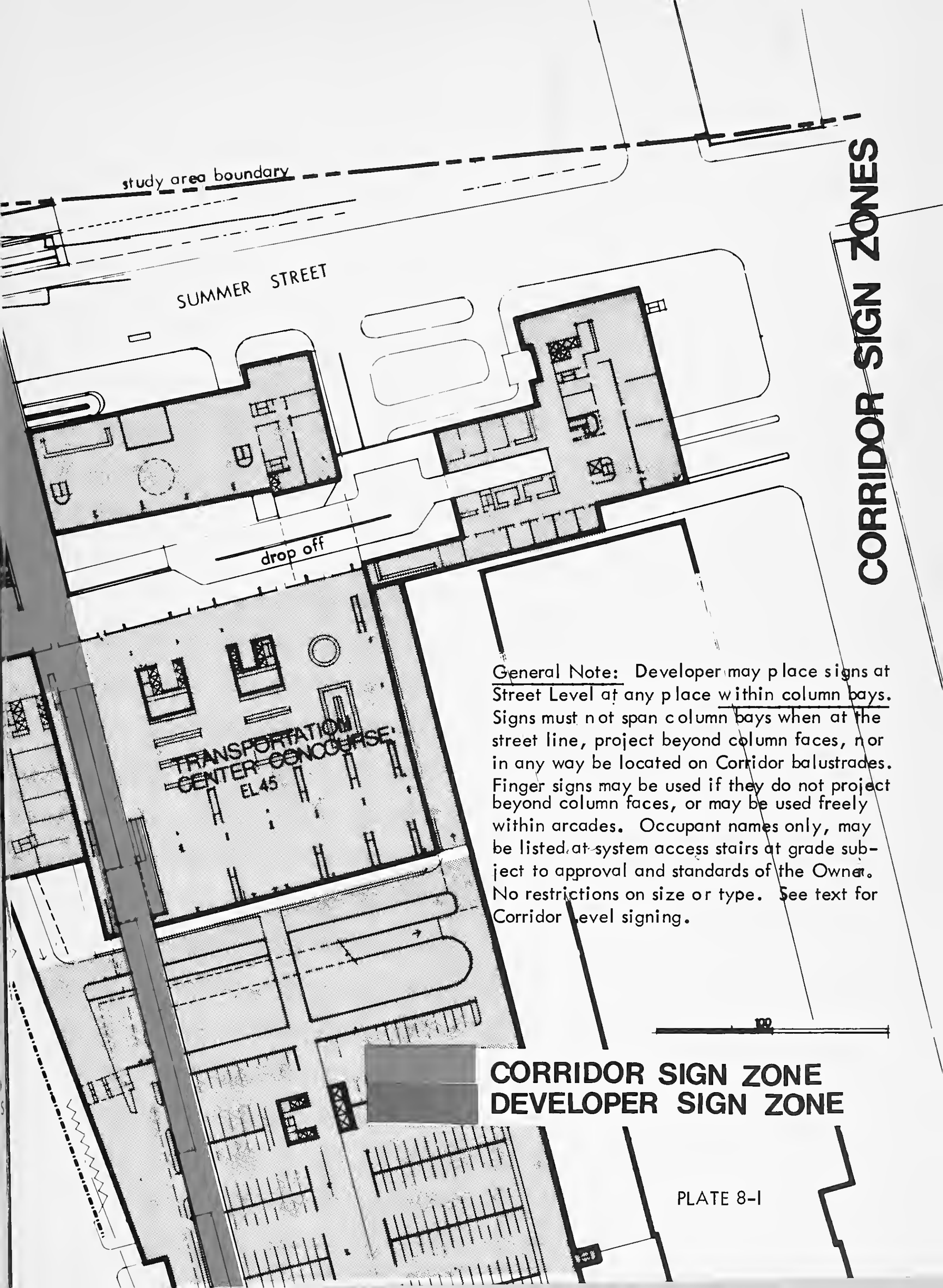
Perceptual: Perceptual considerations, and their implications must be incorporated into design: legibility, acuity, light-dark contrast and visibility levels, day-night visibility differences and standards, distance and spectral quality, colour-contrast legibility, the effects of illumination upon colour, colour blindness, etc. This is especially important as effective communications will only result from a complete understanding of the viewers' capabilities with respect to the interrelationships of visual phenomena.

SIGN ZONES: IT IS RECOMMENDED THAT NO SIGNS OTHER THAN THOSE DESCRIBED IN THE FINAL REPORT OCCUR WITHIN THE MOVEMENT SYSTEM R.O.W. DESCRIBED IN THE FOLLOWING DIAGRAM ALL OTHER GRAPHIC COMMUNICATIONS ARE TO BE LIMITED TO THE PEDESTRIAN WAY WITHIN THE COLONNADE ALONG OCCUPANCY FRONTAGE.

THESE RESTRICTIONS ARE DIRECTED TOWARD MINIMIZING DISTRACTION AND ENSURING MAXIMUM PUBLIC SAFETY TO MOVEMENT SYSTEM AND CORRIDOR PEDESTRIANS.

DEVELOPER SIGN ZONE CONSTRAINTS: IT IS PROPOSED THAT DEVELOPER OR OCCUPANT SIGNING BE LIMITED TO A STRIP 4'-0" WIDE, 12'-0" ABOVE THE CORRIDOR FLOOR, AND TO MAXIMUM 4'-0" SQUARE FINGER SIGNS [ATTACHED ONE SIDE ONLY] BELOW THAT STRIP INTO THE PEDESTRIAN WAY [MORE EXTENSIVE PROJECTIONS WOULD DECISIVELY AFFECT CORRIDOR CHARACTER]. NO CONSTRAINT WILL BE PLACED UPON SIGN TYPE, CONSTRUCTION OR LETTER SIZE, HOWEVER, SELECT COLOURS UTILIZED FOR CORRIDOR SIGNING OR COMMUNICATION AND THE POSSIBLE USE OF BLINKING SIGNS MAY BE RESTRICTED AT TERMINAL POINTS WHERE COMMUNICATION IS CRITICAL. EXACT CONSTRAINTS WILL FOLLOW FROM FINAL DESIGN. IT IS INTENDED THAT A SET OF GUIDELINES RATHER THAN CONSTRAINTS BE DEVELOPED, SUBJECT TO APPEAL AND DESIGN REVIEW BY THE BRA. SIGN ZONES WILL NEED TO BE RE-EVALUATED AT THE TIME OF FINAL DESIGN OF THE CORRIDOR TO ACCOMMODATE ANY NEW CONDITIONS WHICH MAY ARISE.

CORRIDOR SIGN ZONES



General Note: Developer may place signs at Street Level at any place within column bays. Signs must not span column bays when at the street line, project beyond column faces, nor in any way be located on Corridor balustrades. Finger signs may be used if they do not project beyond column faces, or may be used freely within arcades. Occupant names only, may be listed at system access stairs at grade subject to approval and standards of the Owner. No restrictions on size or type. See text for Corridor Level signing.

CORRIDOR SIGN ZONE
DEVELOPER SIGN ZONE

PLATE 8-1

SIGN ZONES: IT IS RECOMMENDED THAT NO SIGNS OTHER THAN THOSE DESCRIBED IN THE FINAL REPORT OCCUR WITHIN THE MOVEMENT SYSTEM R.O.W. DESCRIBED IN THE FOLLOWING DIAGRAM. ALL OTHER GRAPHIC COMMUNICATIONS ARE TO BE LIMITED TO THE PEDESTRIAN WAY WITHIN THE COLONNADE ALONG OCCUPANCY FRONTAGE.

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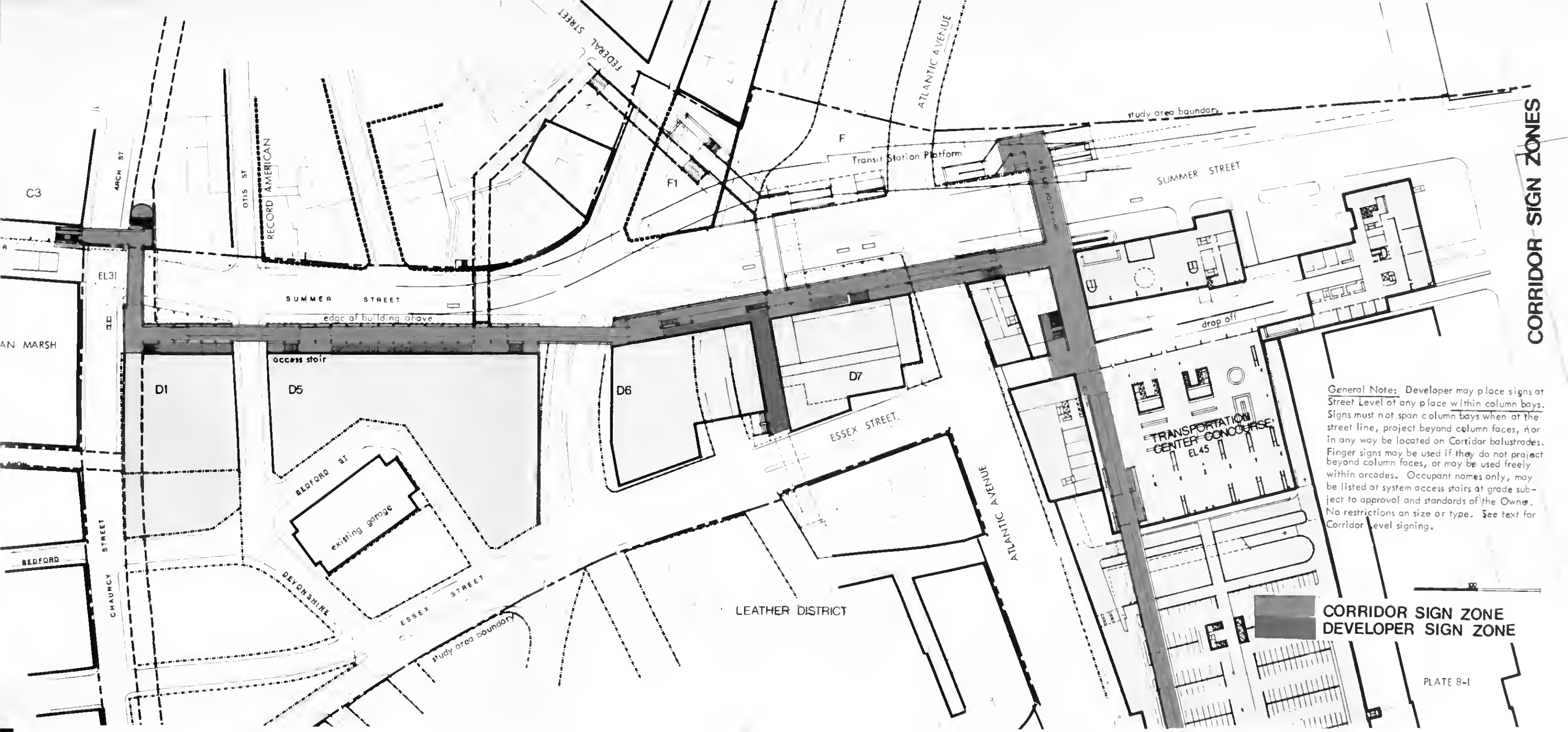


CORRIDOR SIGN ZONES

PLATE 8-I

EXAMINATION OF THE CORRIDOR AS A WHOLE INDICATES THAT COMMUNICATIONS NEEDS MAY BE DEALT WITH ON A 'SITUATIONAL' BASIS, -ESTABLISHING GROUPS, ZONES OR 'SUB-SYSTEMS' WITHIN THE OVERALL CORRIDOR COMMUNICATIONS SYSTEM.

THIS APPROACH ENSURES [1] THE APPROPRIATENESS OF THE COMMUNICATIONS MODE TO ITS PARTICULAR CONTEXT AND CONTEXTURAL NEEDS; [2] RECOGNIZES THE NATURE OF INFORMATION SEQUENCES, AND MOVEMENT SYSTEM CONTINUITY AND FLOW; [3] RESPONSE TO PHASING AND MODULARITY OF THE CORRIDOR ITSELF; AND [4] RESPONSE TO DIFFERENCES IN USER NEEDS.

THE FOLLOWING GENERAL CORRIDOR SITUATIONS OR SUB-SYSTEMS ARE IDENTIFIED, AND INDICATED IN THE FOLLOWING DIAGRAMS:

<u>CORRIDOR ACCESS</u>
DIRECT ACCESS
CONNECTOR BRIDGE ACCESS
REMOTE ACCESS
<u>MOVEMENT SYSTEM TERMINALS</u>
<u>MOVEMENT SYSTEM BALUSTRADES</u>
<u>MISCELLANEOUS</u>
<u>MAINTENANCE</u>
CENTRAL CONTROL
MACHINE ROOMS
SERVICE

COMMUNICATIONS NEEDS WITHIN THESE PARTICULAR SITUATIONS ARE CONSTANT, VARYING ONLY IN MESSAGE CONTENT. CRITERIA, WHEN ESTABLISHED FOR ANY PARTICULAR NEED CAN BE ADAPTED TO SIMILAR SITUATIONS. NEEDS CAN BE MET ON A 'MODULAR' BASIS, SIMILAR TO CORRIDOR PLANNING AS A WHOLE. SPECIAL CONDITIONS ARE VARIENTS, AND ARE LISTED UNDER THAT HEADING.

CORRIDOR SIGN GROUPINGS
CORRIDOR LEVEL

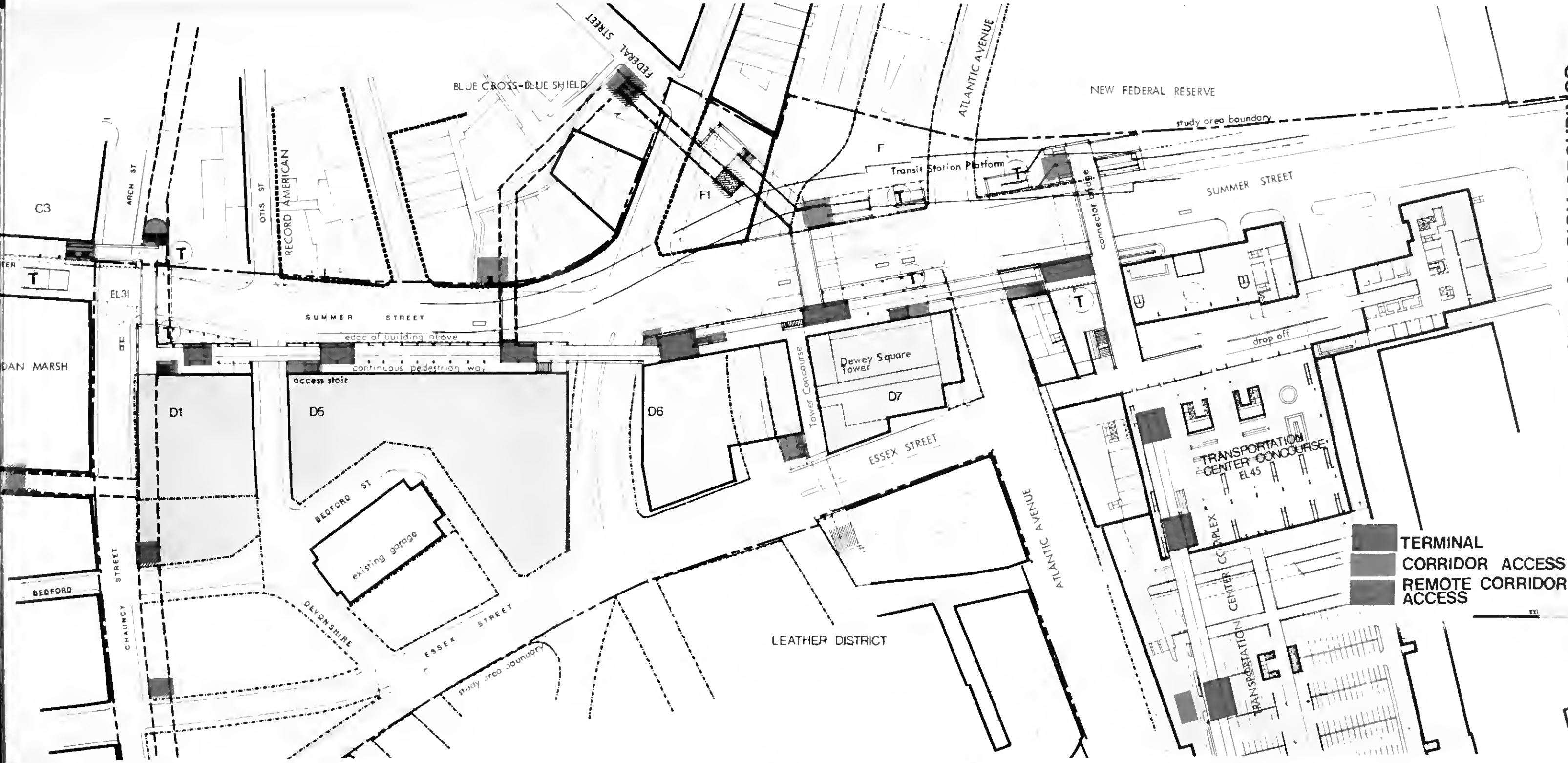
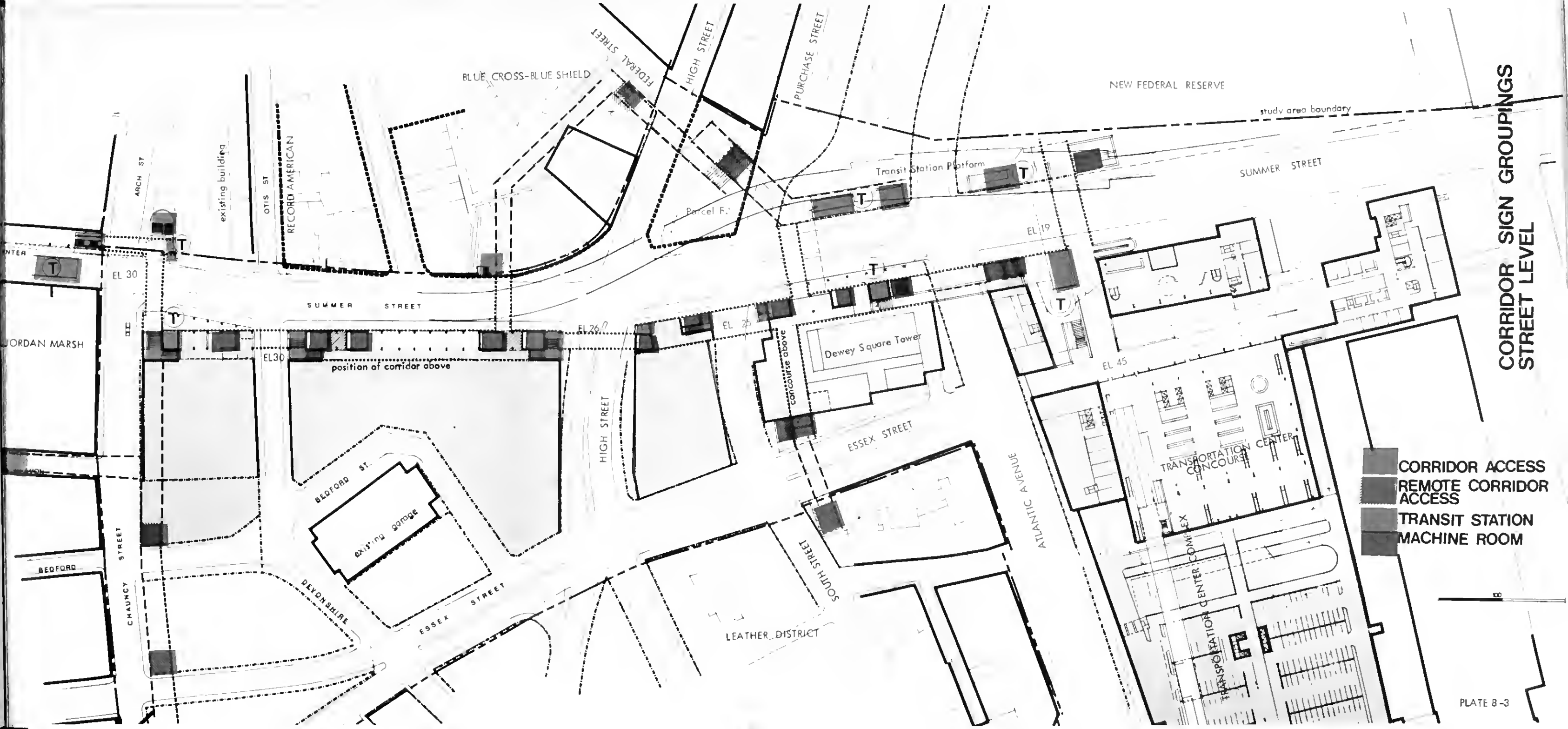


PLATE 8-2



CORRIDOR SIGN GROUPINGS
STREET LEVEL
CORRIDOR ACCESS
REMOTE CORRIDOR ACCESS
TRANSIT STATION
MACHINE ROOM
NEW FEDERAL RESERVE
study area boundary
SUMMER STREET
BLUE CROSS-BLUE SHIELD
FEDERAL STREET
HIGH STREET
PURCHASE STREET
Transit Station Platform
Parcel F
EL 19
ARCH ST
existing building
OTIS ST
RECORD AMERICAN
EL 30
JORDAN MARSH
position of corridor above
EL 26
EL 25
concourse above
Dewey Square Tower
EL 45
ESSEX STREET
ATLANTIC AVENUE
TRANSPORTATION CENTER CONCOURSE
TRANSPORTATION CENTER COMPLEX
BEDFORD ST.
existing garage
DEVONSHIRE
ESSEX STREET
CHAUNCY STREET
BEDFORD
SOUTH STREET
LEATHER DISTRICT

PLATE 8-3

DIRECT CORRIDOR ACCESS:

Description: Conditions of access from street level to the pedestrian corridor above in which pedestrian has direct sight of corridor position.

Communication need:

Up from Street:

[1] Identify corridor and/or movement system above including directional indicator;

[2] Identify shops or occupants of that particular block;

[3] Reinforce identity of stair as corridor access.

Down from Corridor:

[1] Identify destinations served by access stair, including directional indicator.

Notation Example:

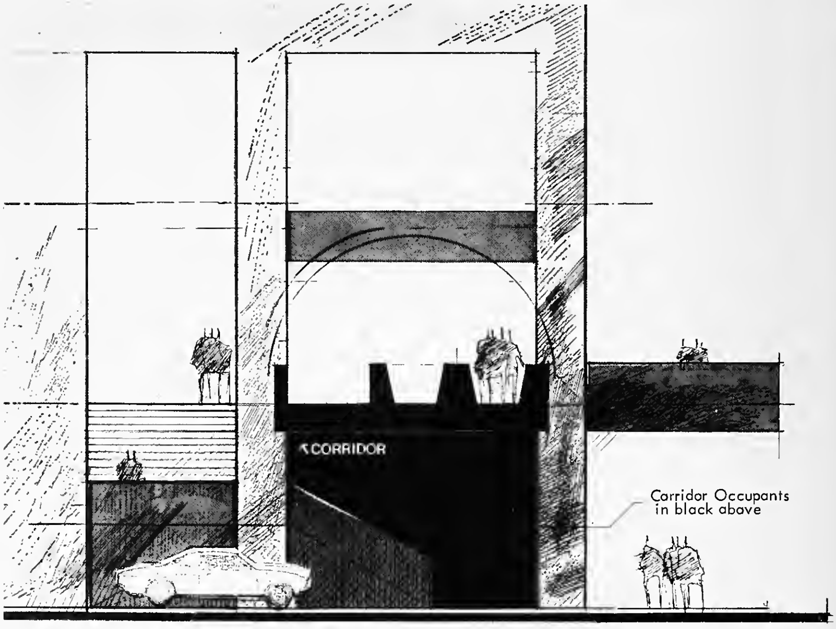
"MOVING WALK [directional indicator] to Transportation Center and Mall"

Comment: It will be necessary at the time of final design to establish whether the movement system and/or Corridor is the proper 'destination' served by the access stair. If it is 'Movement System', the notation example above is applicable; if the Corridor is intended to receive special significance as a 'place' with its own name, then this name should dominate the message: eg.-

"CORRIDOR [directional indicator] Moving Walk to Transportation Center and Mall".

"Moving Walk" presently is recommended as the simplest terminology for identifying the system. The preferred terminology should be used consistently, and referred to in all public releases or notices in the same way so as to build up an acceptance and recognition of the mode in common usage.

SECTION THRU BRIDGE AT CORRIDOR ACCESS STAIR



SECTION THRU BRIDGE AT STREET LOOKING TOWARD CORRIDOR ACCESS

BRIDGE ACCESS:

Description: Similar to 'Direct Corridor Access with the exception that an additional communication is required at the top of the stair connecting to the bridge when a choice of direction is presented the pedestrian. The access to the Federal Reserve connector bridge is an example. Such an access point serves both the corridor and a developer's 2nd level. Such transitional areas will be difficult to control; final signing recommendations need to follow policy decisions on 2nd level pedestrian network jurisdiction within the CBD and extent of its continuity.

Communications needs in addition to those required for 'Direct Corridor Access' [Applicable when a directional choice is presented. Locate at top of stoir.]:
[1] Repeat message at street level, including directional indicator;
[2] Repeat message indicated at head of bridge where it connects to terminal, describing destinations served by bridge, eg.- MBTA stations, street names, etc.

REMOTE CORRIDOR ACCESS:

Description: Conditions of access from the street level in which the corridor itself is not directly visible to the pedestrian, including points which may occur as a result of future expansion of the 2nd level pedestrian system.

Considerations: At a certain distance, the presence of the movement system is unimportant toidentify unless the remote access is at one of the terminal ends of the corridor,- the corridor itself, however, should it receive importance and identity as a 'destination' should be identified including a directional indicator at the street level of such remote access. Shops or occupancies directly within the block served by that access should be listed at street level,-and the street or destinations served by that access listed at its top landing.

TRAFFIC FLOW:

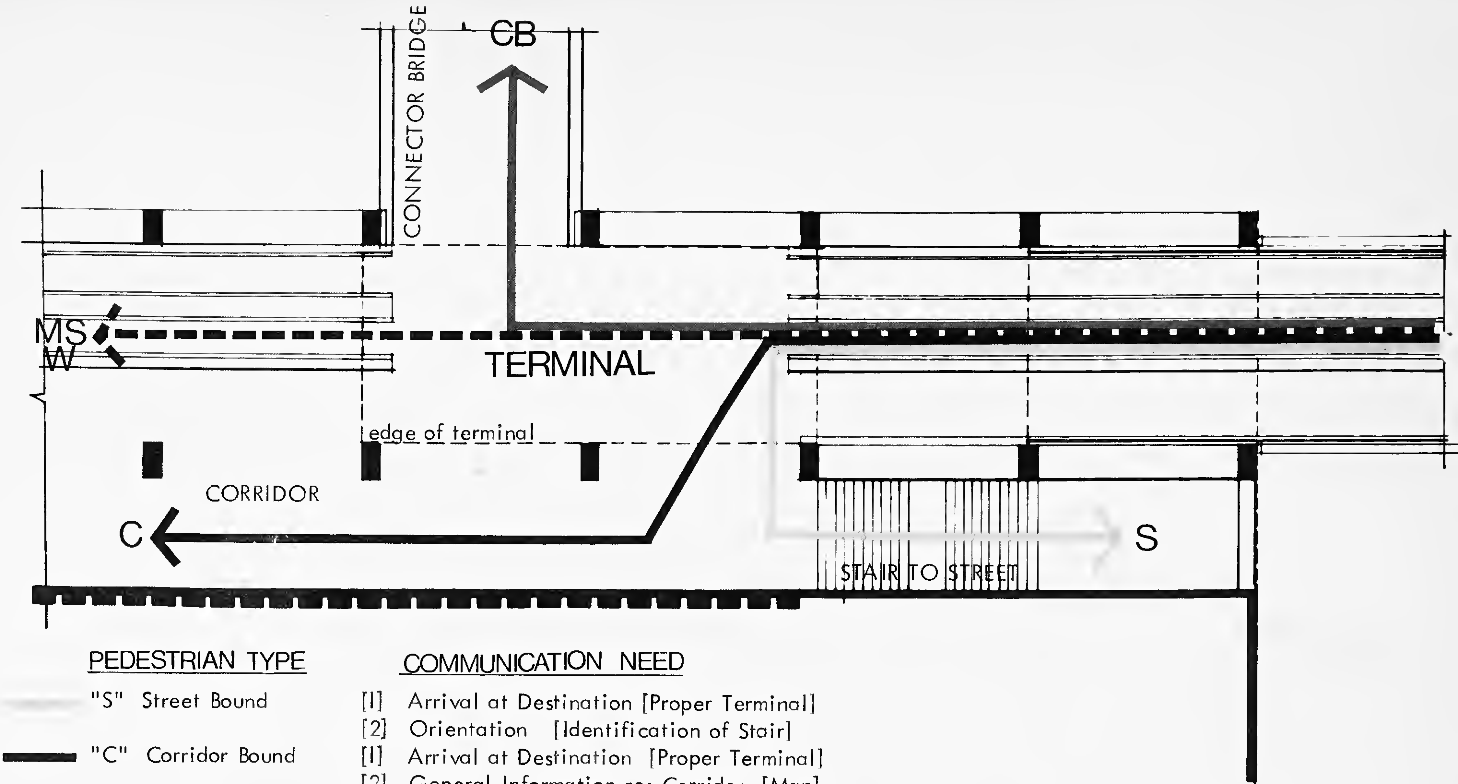
A series of traffic flow overlays and destination diagrams were examined to determine communications needs at movement system terminals.

The example following illustrates pedestrians with dissimilar destination needs exiting from a movement system lane. All pedestrian types require attention devices at the system exit and identification of the particular terminal. Pedestrians destined for the connector bridge or stair and street require directional indicators in association with destinations as they are not immediately visible and the pedestrian should be prepared to move in that direction immediately upon leaving the system. Preparation for this decision should not conflict with the lead time necessary to concentrate his attention on the exit maneuver. Pending time-distance visibility studies, he should receive approximately 50 ft. advanced notice coupled with an attention mechanism, such as blinking. Exact distance will be a factor of system speed and visual acuity.

A series of pedestrian flow overlays at the terminal based upon pedestrian direction and origin (e.g., eastbound, westbound, bridge bound) were examined to determine (I) common needs, (2) proper position of connector bridge relative to movement system queues, (3) proper direction of movement system lanes, and (4) optimal positions of communications media. (See Plate 5B-2I).

TERMINAL SIGNING KEY:

Pedestrian flow analysis and communications needs which they demonstrate should be codified so as to provide a master key by which additions or changes in notations, signing positions, media, etc. can be re-examined both during design development and after completion of the project with respect to the different users and their routes thru the typical terminal or its variant. Since needs and routes may conflict, priorities should be assigned and explained within the key and its criteria.



PEDESTRIAN TYPE	COMMUNICATION NEED
"S" Street Bound	[1] Arrival at Destination [Proper Terminal]
	[2] Orientation [Identification of Stair]
"C" Corridor Bound	[1] Arrival at Destination [Proper Terminal]
	[2] General Information re: Corridor [Map]
"MS-W" Movement System West	[1] Location [Orientation, - Terminal ID]
	[2] Movement System Entry
	[3] Movement System Destinations
	[4] Further Orientation or Directional Map
"CB" Connector Bridge	[1] Arrival at Destination [Proper Terminal]
	[2] Location of Bridge and Place it serves

TRAFFIC FLOW STUDY PEDESTRIANS GENERATED BY MOVEMENT SYSTEM -WESTBOUND

SUMMARY OF SIGNING OR COMMUNICATIONS NEEDS AT TYPICAL TERMINAL:

The following are reconciled from pedestrian needs identified in the various traffic flow studies:

Movement System Terminal-East Face (Entering from bridge via movement system or bridge):
[1] Identification of arrival point (Terminal) including directional indicator if required for immediate decision (arrival point includes major destinations served by that terminal);
[2] Attention/warning device to notify system user that exit is approaching.

[Note: These 2 requirements should be combined in the same communications device if possible.]

Movement System Terminal - West Face (Entering terminal from West and Mall via Corridor or bridge]:
Same as East face. List all pertinent arrival points served by terminal. Directional indicators are to be used only if no more appropriate position exists and decision is required from the pedestrian before he leaves the system in order to implement traffic flow.

Movement System Terminal - Entry to System:
[1] Identify entry belt lane;
[2] Destinations served by that entry point including Movement System direction (e.g. , Mall/Transportation Center);
[3] Warning against entering exit lane.

Movement System Terminal - Entry to Connector Bridge:
Destinations served by that bridge, including directional indicator.

Movement System Terminal - Entry to Terminal from Bridge:
[1] Identify terminal if necessary;
[2] Orient pedestrian as to general movement System Direction (e.g., Mall/Transportation Center).
[Note These needs may be combined.]

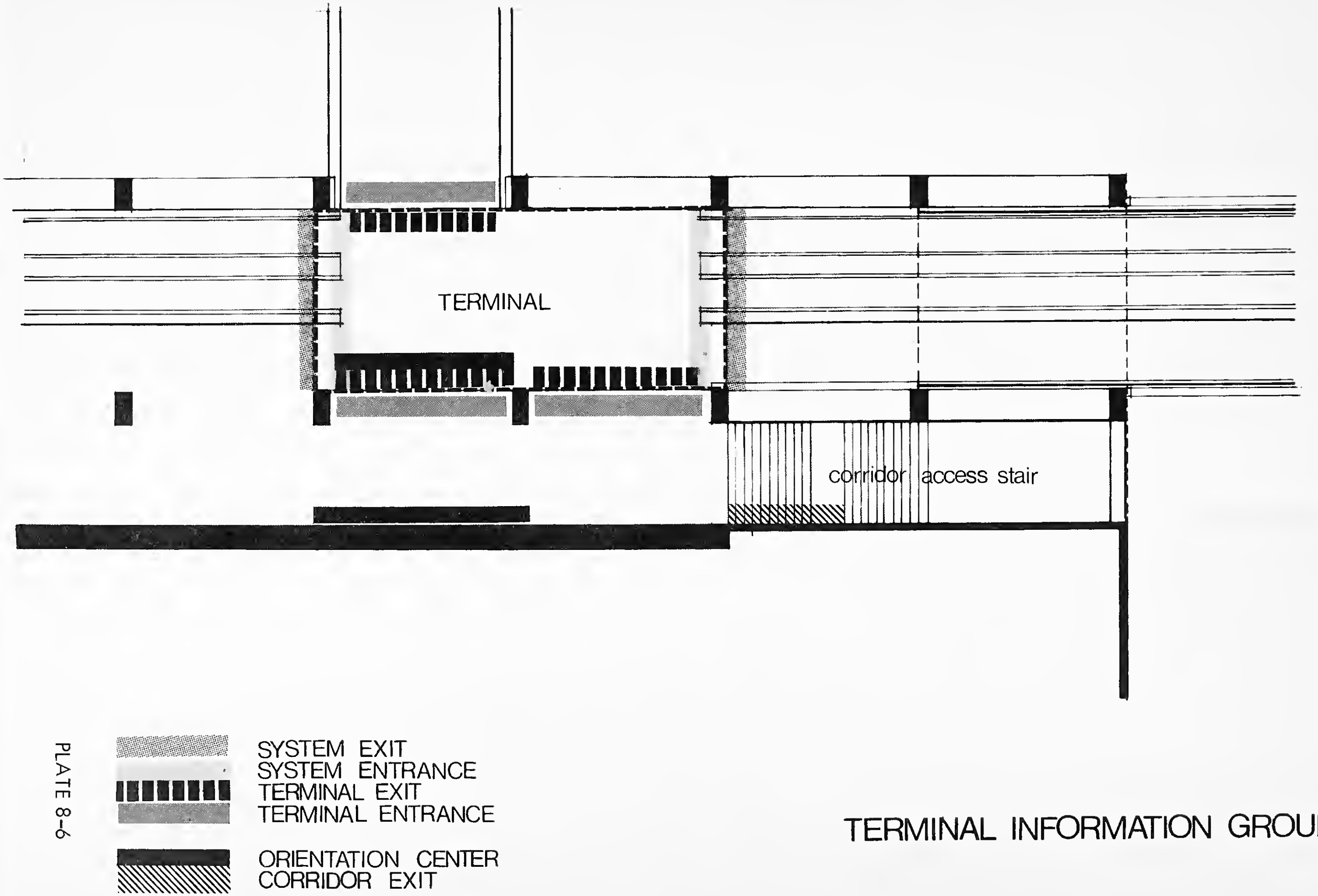
Movement System Terminal - Corridor Face (persons entering from Corridor, Access Stairs):
[1] Orient pedestrian to general Movement System direction via System Destination (e.g., Mall/Transportation Center), and directional indicators.

Movement System Terminal - Entry to Corridor and Access Stair:
[1] Destinations served by Corridor/Access Stair with Directional indicator if required;
[2] Orientation Map for persons leaving terminal, locating terminal relative to system and showing major destinations.

Terminal Distribution/Orientation Center: (Informational)
[1] CBD Map (general) locating the pedestrian way relative to major destinations and streets, districts in the CBD
[2] Corridor/System Orientation Map: Diagrammatic map indicating Corridor, the user's position in the Corridor, terminals, streets, primary destinations, access and MBTA stops along the Corridor. Shops or occupancies within each block along Corridor frontage should be listed. A CBD information center if established, should be designated;
[3] Transit information, if not included adequately in the above.

[Note: Any other elements which may be eventually incorporated into this Center, such as telephones, trash receptors, etc. should be examined to determine signing needs as final design dictates.]

Logo: A system or corridor logo is appropriate for use at any place identifying the presence of or directing to the system or corridor. It must not be applied indiscriminately or arbitrarily.

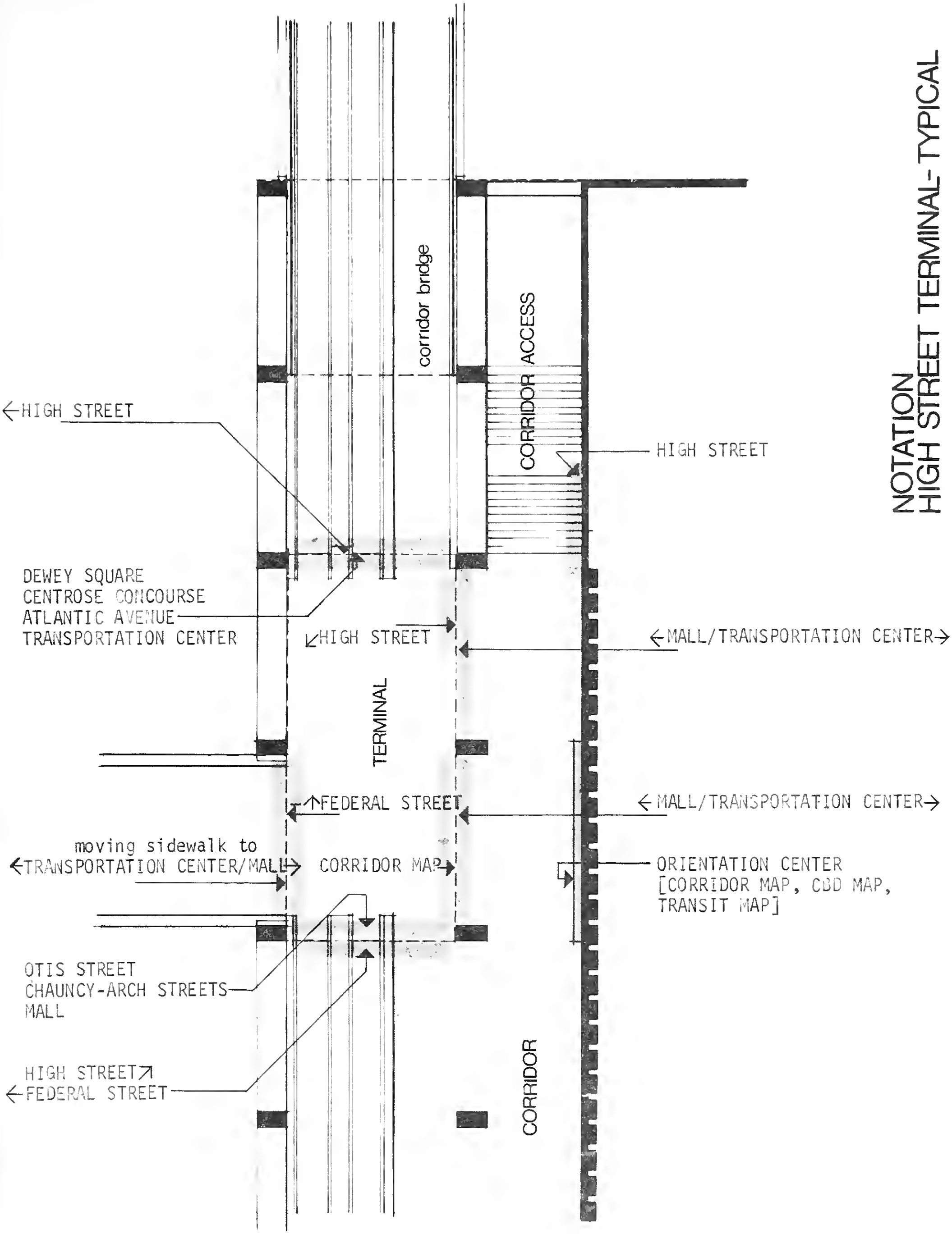


TERMINAL INFORMATION GROUPS

PLATE 8-6

TERMINAL COMMUNICATIONS NEEDS - SIGN TYPES ACCORDING TO TASKS: GENERAL

Movement System Entry:	Destinations Identify System entry lane.
Movement System Exit:	Terminal Identification Exit Warning Directional Indicators as required.
Terminal Entry:	Movement System Direction (purpose:orientation).
Corridor Access/ Exit:	Top: (Exit) Destinations Directional Indicator Bottom: (Access) Identification of Corridor Movement System with directional indicator Tabulation: Occupancy of Corridor above.
Terminal Orientation Center:	Purpose: Information; orientation System Directional Map (Corridor) (See Diagram) CBD Map Transit Access/System.
Corridor Map:	Purpose: In-terminal orientation relative to system Simple system diagram with terminals and position relative to same.



NOTATION
HIGH STREET TERMINAL-TYPICAL
corridor bridge
CORRIDOR ACCESS
←HIGH STREET
HIGH STREET
DEWEY SQUARE
CENTROSE CONCOURSE
ATLANTIC AVENUE
TRANSPORTATION CENTER
↙HIGH STREET
←MALL/TRANSPORTATION CENTER→
TERMINAL
↑FEDERAL STREET
←MALL/TRANSPORTATION CENTER→
moving sidewalk to
←TRANSPORTATION CENTER/MALL→
CORRIDOR MAP→
ORIENTATION CENTER
[CORRIDOR MAP, CBD MAP,
TRANSIT MAP]
OTIS STREET
CHAUNCY-ARCH STREETS
MALL
HIGH STREET↗
←FEDERAL STREET
CORRIDOR

PLATE 8-7

DESIGN DEVELOPMENT: TERMINAL HOUSING

The terminal grouping of messages has been approached as a related set of needs. The design proposal is to house these needs within one framework, integrated with lighting, and heating devices.

This housing will serve to accent and mark the place of entry and exit from the system to all corridor users, and be visible from the street.

It is intended to unify and provide a stable context for all notation and communications needs identified at the terminal point, integrating with lighting, intercom, and monitoring with a minimum of distraction. The housing itself should be identified as a large simple block covering the terminal zone, - designed independently of columns so as to permit continuity of design and proper placement. Sharply illuminated messages should appear at the appropriate places on the exterior faces serving the bridges, corridor and system entry. Typeface stroke width and height of letter must be examined for final sizing, position and illumination level.

The housing itself should be consistently dark in colour, interior and exterior, and with a non-reflective surface. It should receive a modular surface flush sign insert on the exterior faces, and a canted illuminated unit with white or coloured background and dark letters inside.

Brightness of letters and background illumination should be more intense than terminal area lighting. This in turn, must be sufficiently intense to attract attention to the arrival surface. A correct relationship can be partially achieved thru the use of down lighting which is surface directed, so that persons and objects within the area are brilliantly lit, but the source is not obvious, minimizing glare, contrast and distraction.

Blinking can serve as an effective attention device at exit points.

A strong housing framework will contribute substantially to realizing communications objectives at the terminal, providing a strong, consistent and recognizable form. Terminals at the transportation center, even with lower ceilings, can be approached in the same manner.

Cost must be developed conjointly with that of the remainder of the corridor. A certain portion of the housing cost should be supported by the graphics allowance if this must be separated.

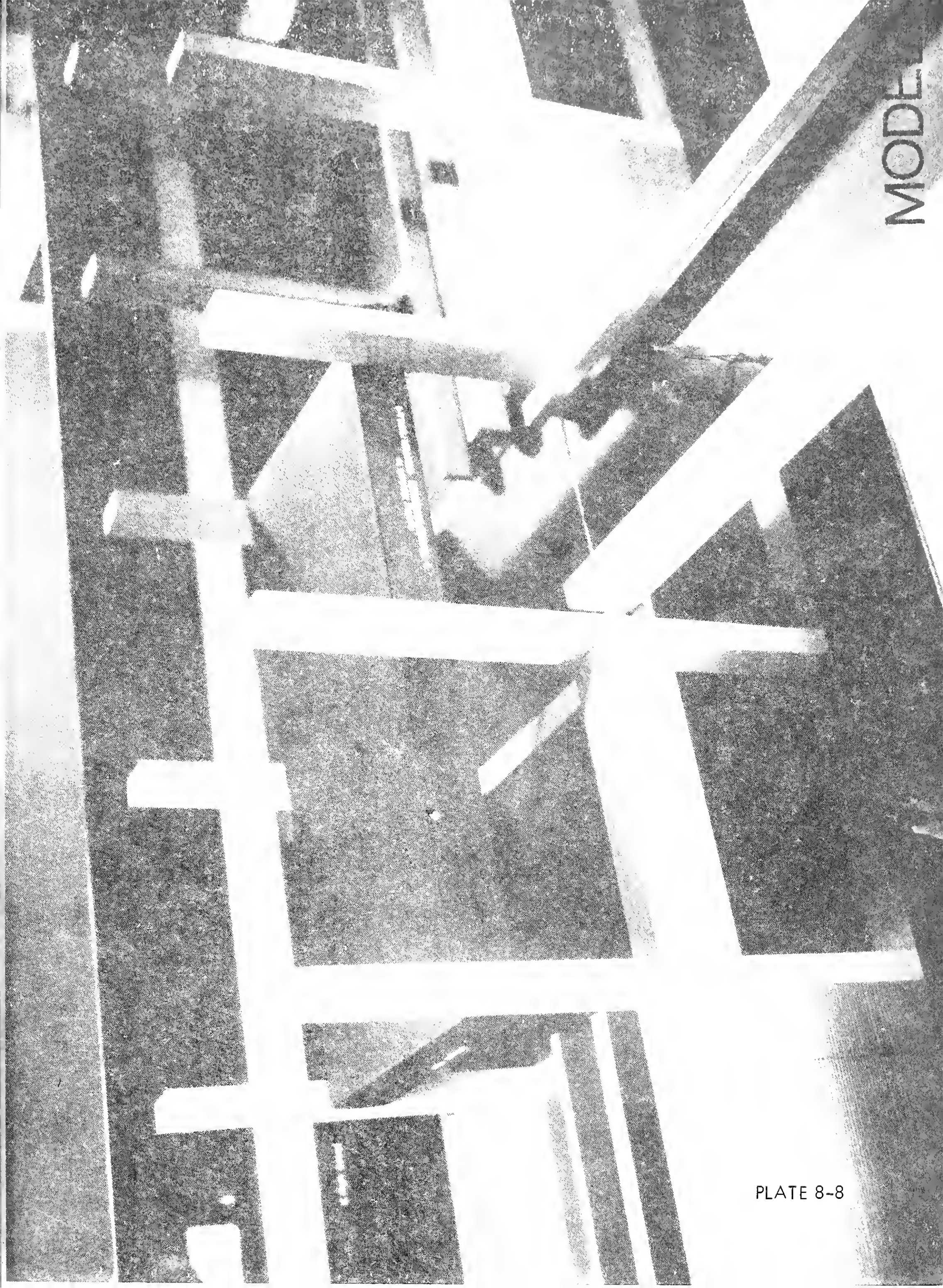
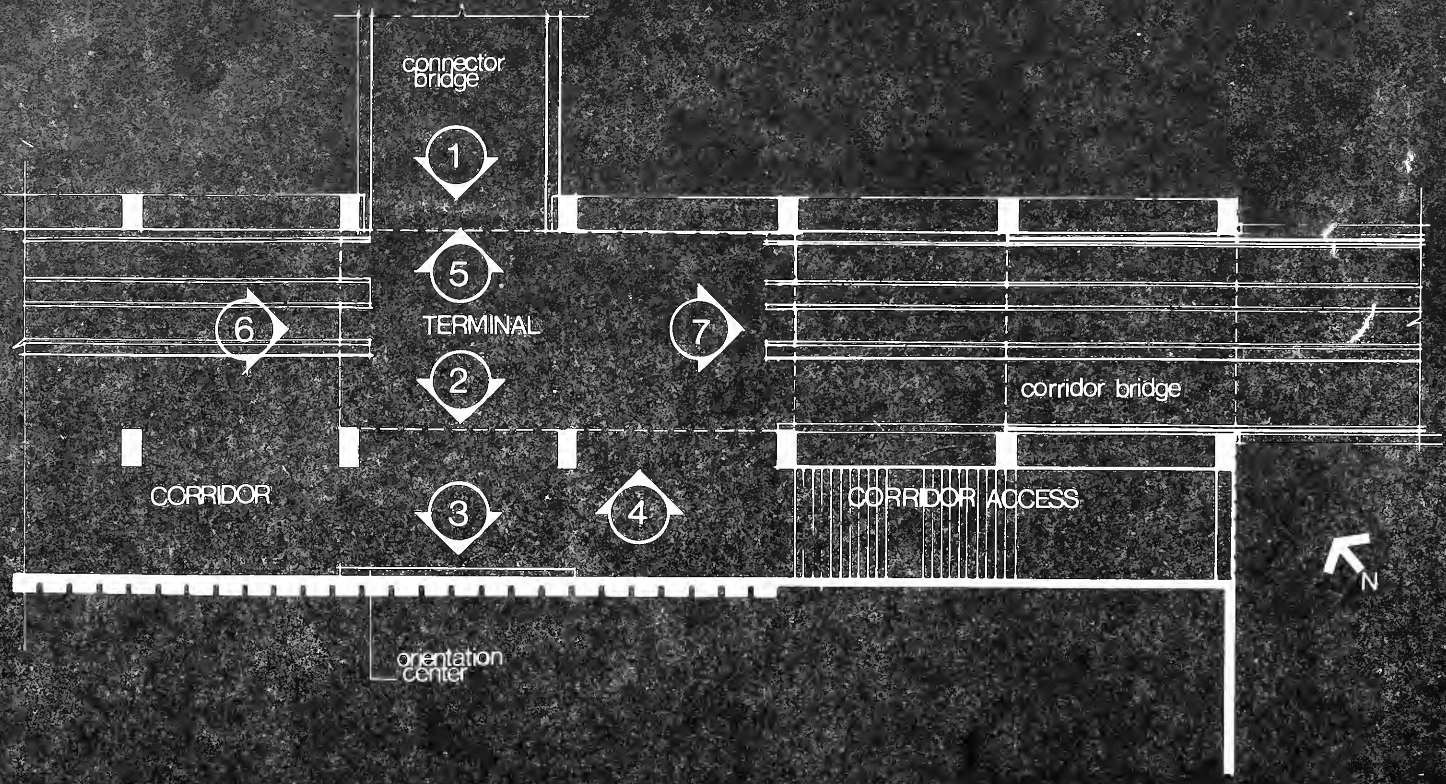
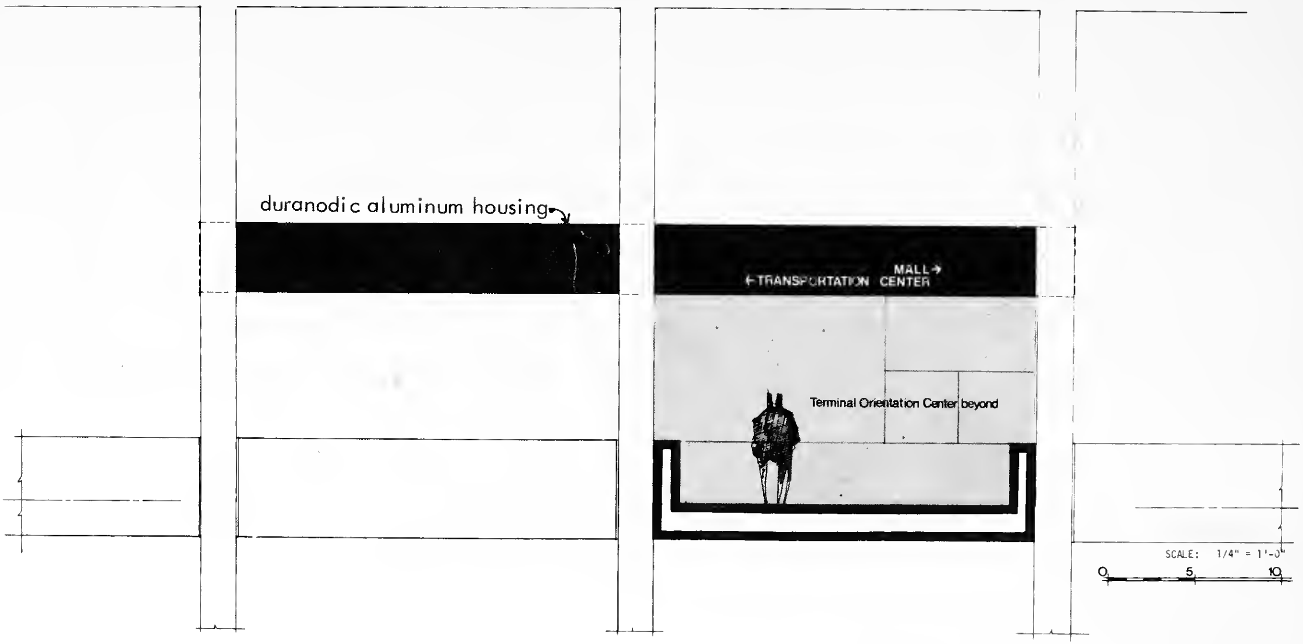


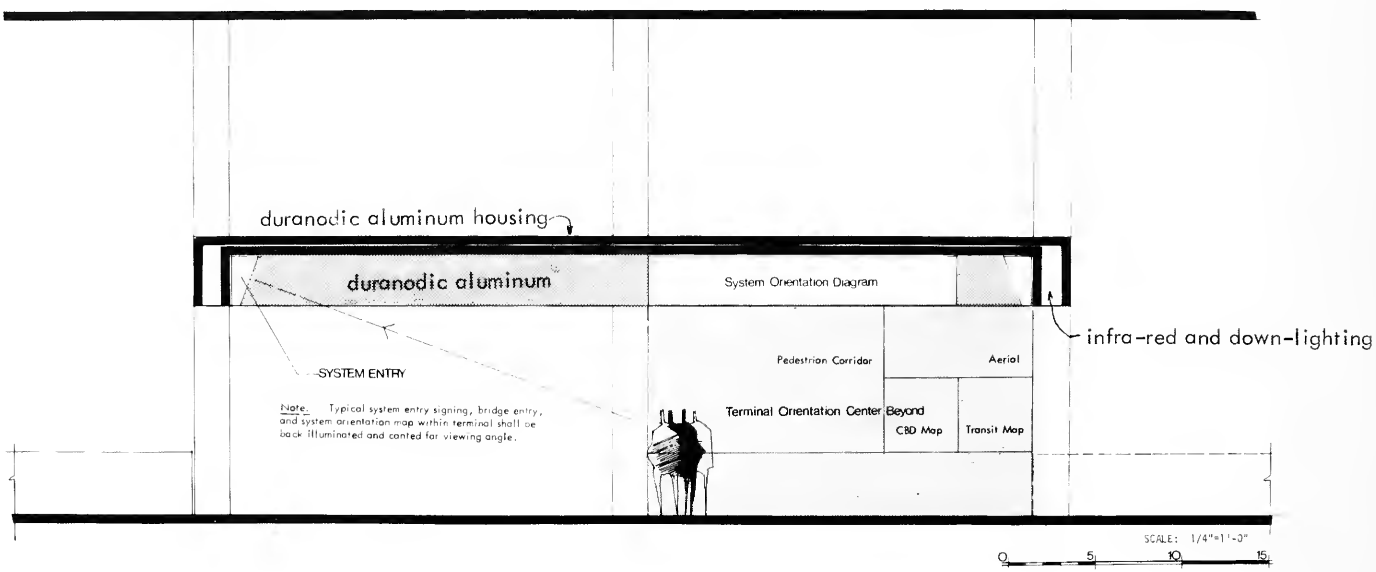
PLATE 8-8



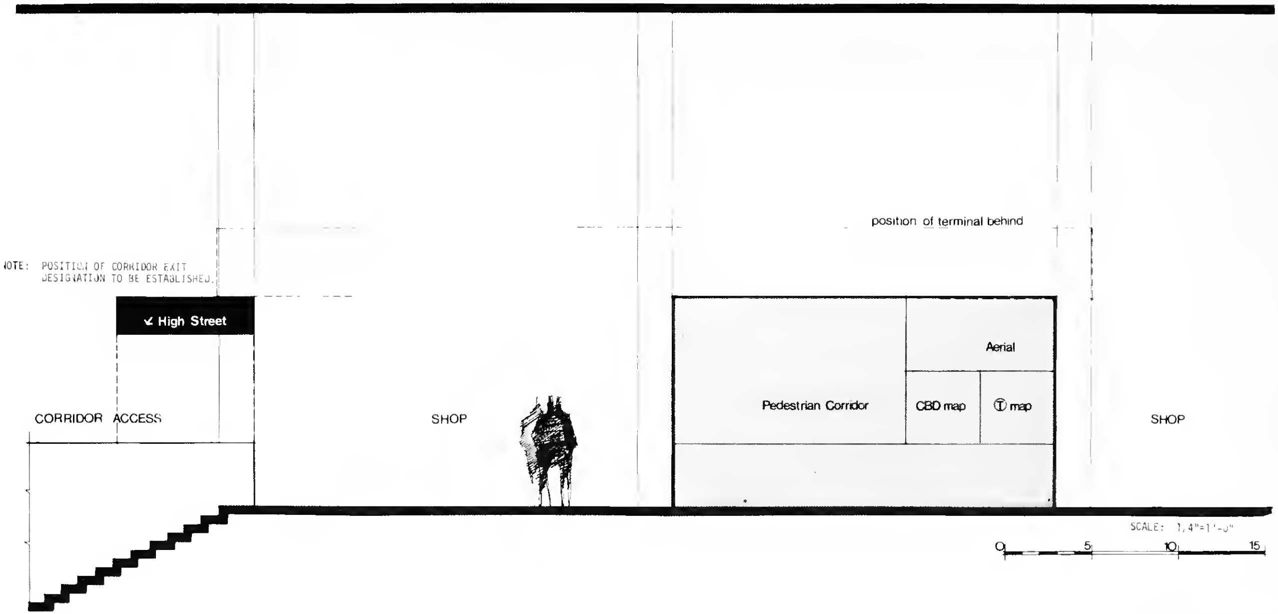
TERMINAL PLAN-
ELEVATION & SECTION TARGETS



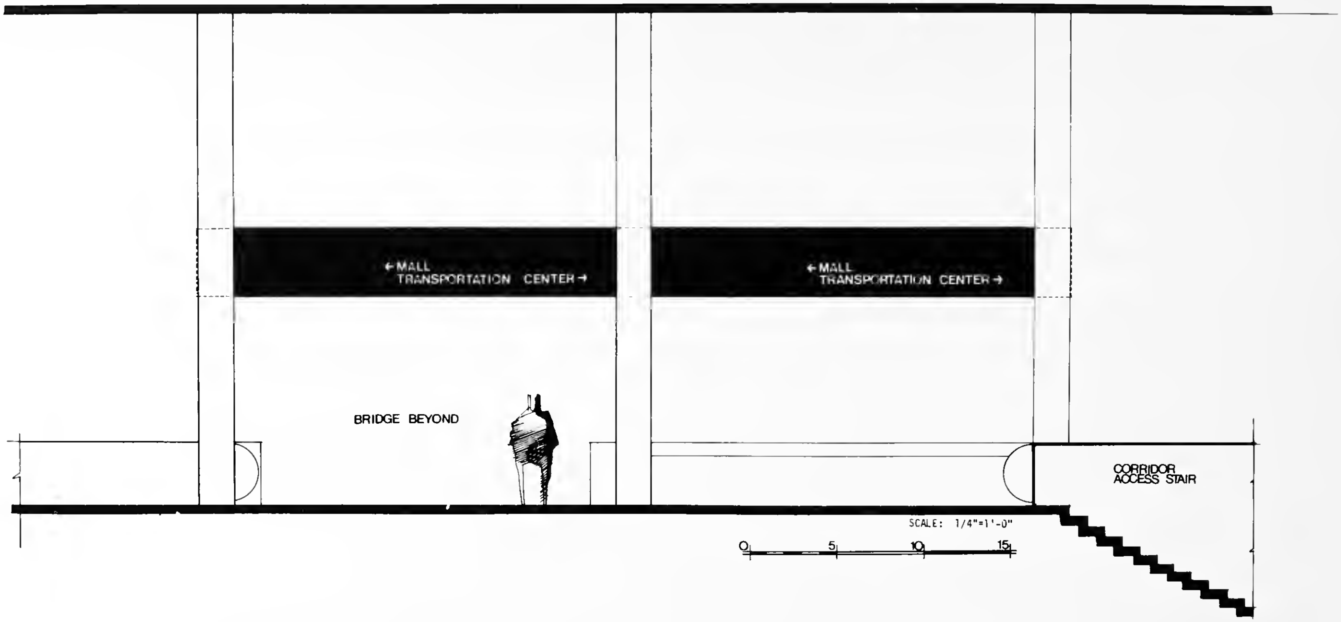
TERMINAL – ELEVATION 1
LOOKING SOUTH FROM BRIDGE



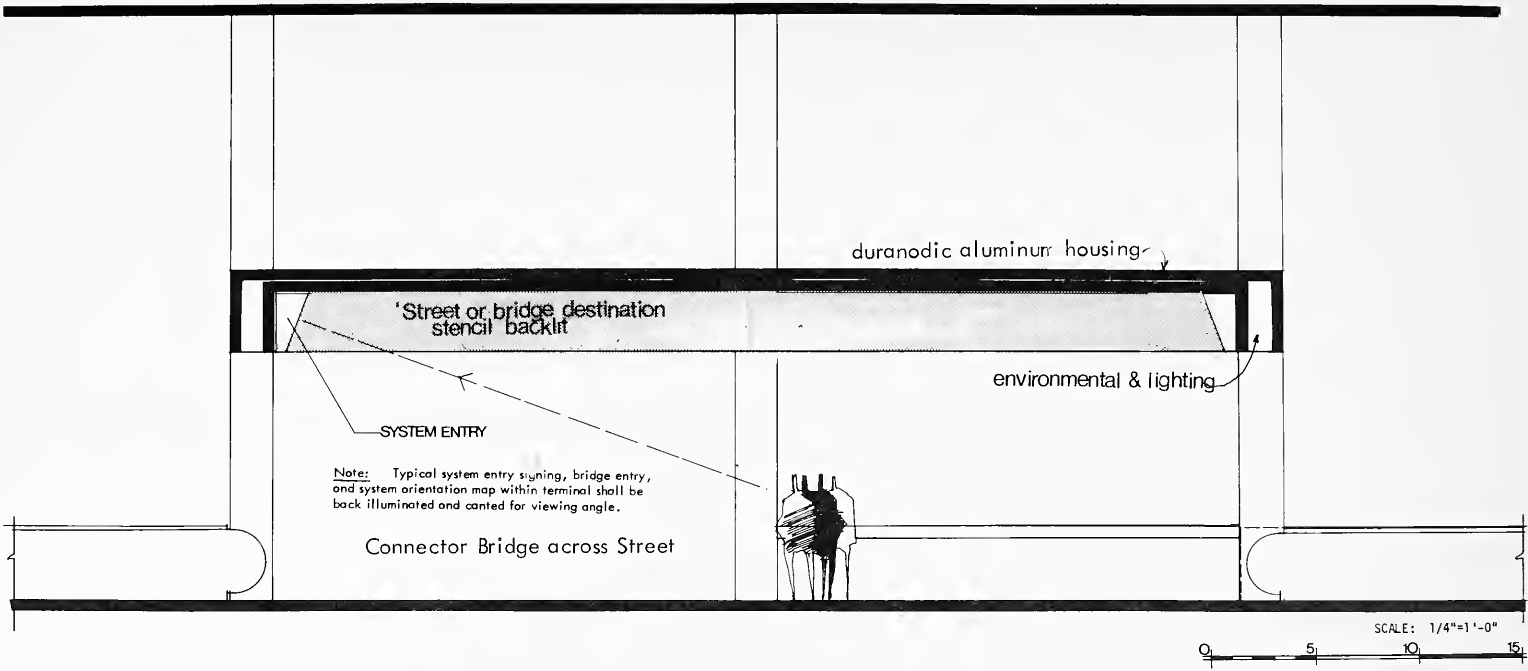
TERMINAL – SECTION ELEVATION 2
LOOKING TOWARD CORRIDOR



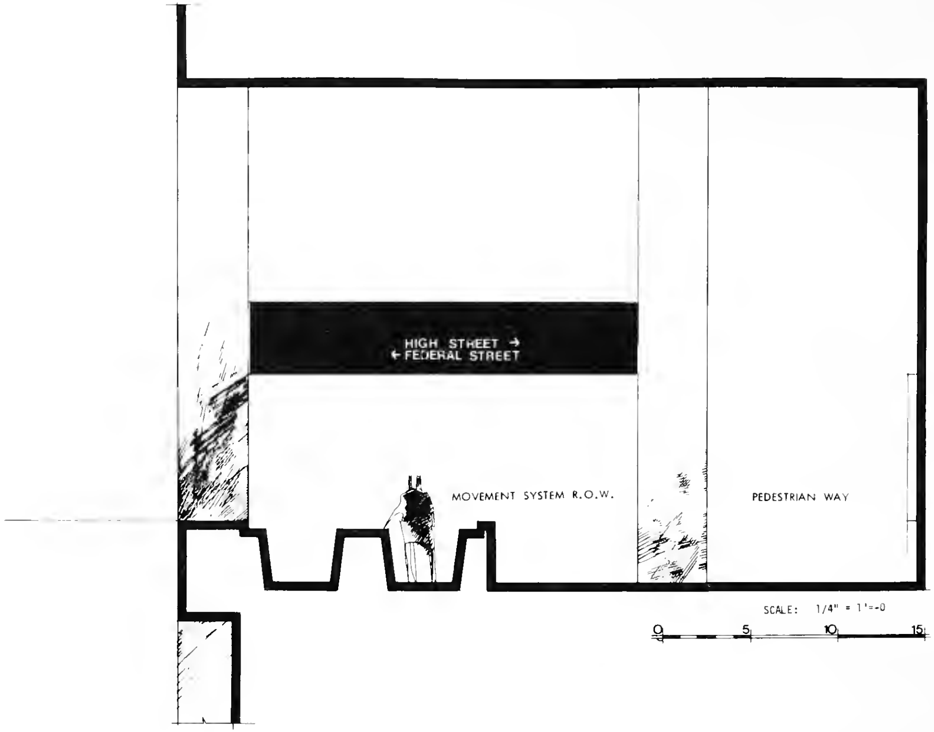
TERMINAL – ELEVATION 3
ORIENTATION CENTER



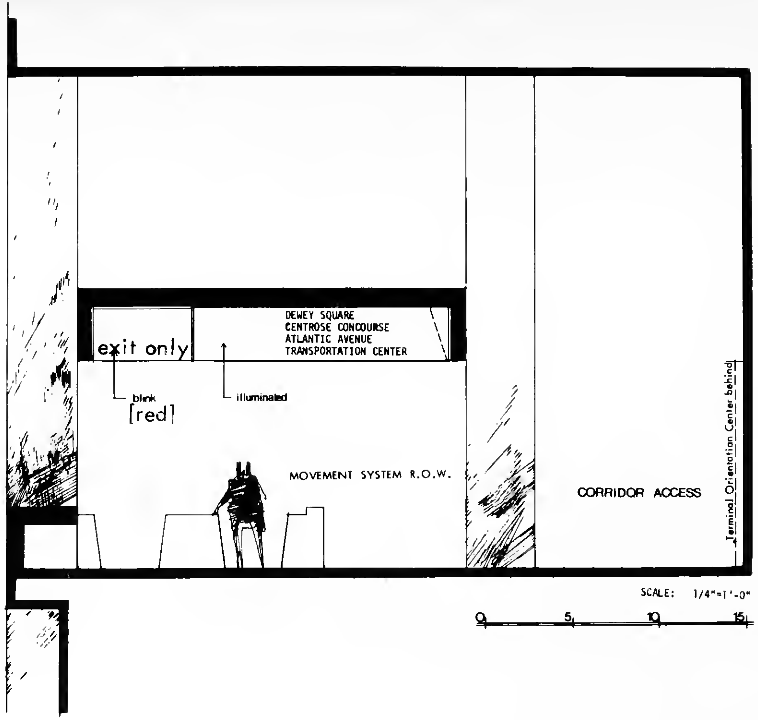
TERMINAL-ELEVATION 4
LOOKING NORTH FROM CORRIDOR



TERMINAL-SECTION ELEVATION 5
LOOKING TOWARD BRIDGE



TERMINAL - ELEVATION 6



TERMINAL - ELEVATION 7
SYSTEM ENTRY

PLATE 8-17

"NOTATION"

PLATES 8-18, 8-19. and 8-20 follow in the final printing. These plates are illustrative of specific notation required in a typical terminal and delineate spacing, locations and standards in detail.

[8-35]	PLATE 8-18
[8-36]	PLATE 8-19
[8-37]	PLATE 8-20

ORIENTATION CENTER

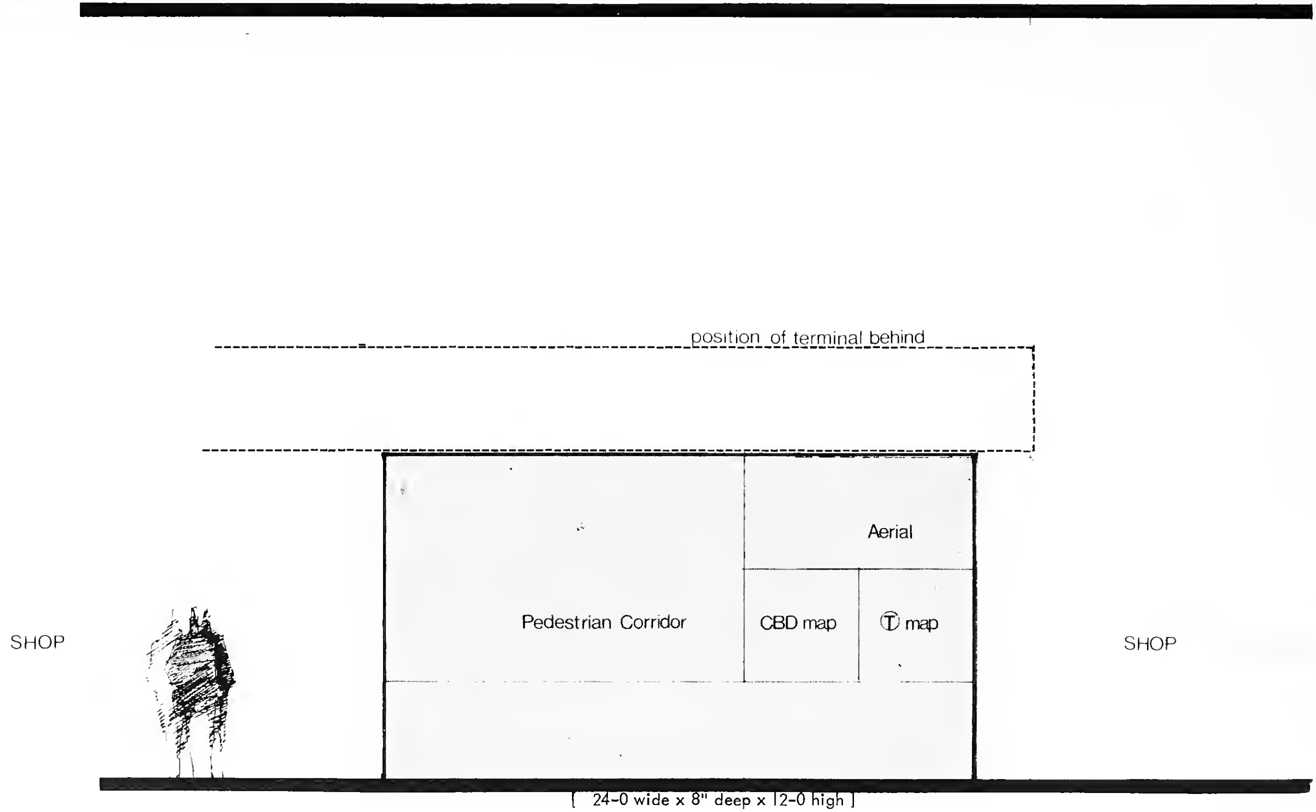
PURPOSE: ORIENT SYSTEM USER AND PEDESTRIAN WITHIN THE CORRIDOR.

DESCRIPTION: A CENTRAL FACILITY WHERE ALL RELEVANT OR IMPORTANT INFORMATION ABOUT THE CORRIDOR, ITS ROUTE, DESTINATIONS, OCCUPANTS, AND RELATIONSHIP TO THE CBD AND TRANSIT FACILITIES ARE DISPLAYED. IT SHOULD BE CONSTRUCTED OF DURABLE, READILY UPDATED MODULAR UNITS.

INFORMATION: THIS CENTER SHOULD INCLUDE A DIAGRAMMATIC SYSTEM DIRECTIONAL MAP, CBD MAP [IF THE SYSTEM MAP CANNOT BE INCLUSIVE], AND TRANSIT INFORMATION.

LOCATION AND FREQUENCY: EACH TERMINAL - LOCATED OUTSIDE THE MAIN LINE OF TRAFFIC BUT VISIBLE FROM THE TERMINAL AND SERVING ALL CORRIDOR OR SYSTEM PEDESTRIANS.

THE CENTER INDICATED IN TERMINAL DRAWINGS HAS BEEN LOCATED AGAINST THE INNERMOST WALL OF THE CORRIDOR OPPOSITE THE CONNECTOR BRIDGE POSITION, AND ONE BAY IN FROM THE ACCESS STAIR IN ORDER TO SERVE ALL PEDESTRIANS AND MINIMIZE PEDESTRIAN STACK-UP.



Materials: Duranodic frame, dark bronze.
Acryllic.
All elements should be removeable readily without projecting ar obvious fastenings.

ORIENTATION CENTER

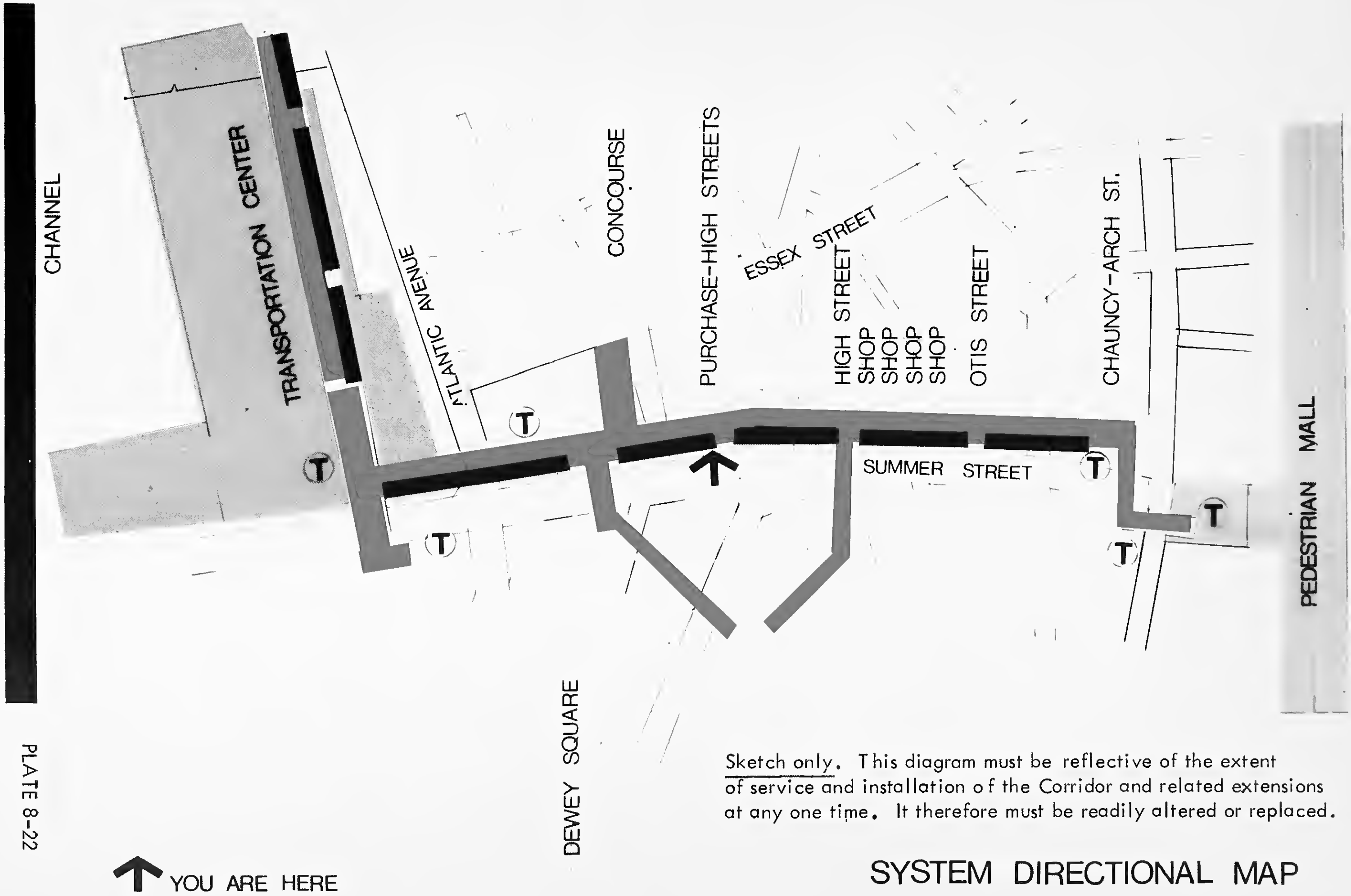
PURPOSE: ORIENT SYSTEM USER AND PEDESTRIAN TO HIS POSITION WITHIN THE CBD AND THE CORRIDOR.

DESCRIPTION: A SIMPLE DIAGRAMMATIC MAP INCORPORATED WITHIN THE TERMINAL ORIENTATION CENTER AND MOUNTED PARALLEL TO THE DIRECTION OF THE CORRIDOR AND TRUE TO ITS DIRECTION FOR THE PEDESTRIAN READING IT. IT SHOULD INCORPORATE THE FOLLOWING INFORMATION:

- Corridor Route
- Terminals (by name)
- Transit Stations
- Street Map (simplified with streets and major pedestrian networks identified)
- Major Destinations (Mall, Channel, Transportation Center, Districts, Dewey Square, etc) within the CBD area
- Shops along the Corridor Route only, within each block
- North Indicator
- Viewers' Position indicator
- Information Center, if any -- CBD

Phasing: This map should be designed in such a way that it can be updated or altered readily as directional needs change and/or the pedestrian network changes over a period of time. Its components, accordingly, must not become obsolete. The map should be readily removeable to permit either additions or alteration and replacement. Sub-surface printing on acrylic plastic mounted directly to an exterior surface is suggested for terminal orientation centers -- back illumination should be considered at the Transportation Center concourse Terminal.

Colour: Distribution networks, streets or 2nd level, and the Corridor position should be distinguished by colour or tone. Red-orange is recommended for the immediate Corridor.



Sketch only. This diagram must be reflective of the extent of service and installation of the Corridor and related extensions at any one time. It therefore must be readily altered or replaced.

SYSTEM DIRECTIONAL MAP

PLATE 8-22

Purpose: Orient system user at terminal quickly as to his position in the corridor.

Description: A simple diagrammatic map mounted within the terminal parallel to the Corridor similar to the system directional map but greatly simplified. The sign should be back lit for legibility and integrated into the terminal framework. The pedestrian must be able to identify immediately his position,and continue in the mainstream traffic flow or step forward to consult the system directional map at the orientation center if additional information is required.

Information: The map should incorporate the following information:

Corridor Route
Terminals [names]
Transit Stations
Major Corridor Destinations
[Transportation Center, Mall, Dewey Square Concourse]
Viewers Position

Street names are already indicated by terminal names; additional information can be acquired at the orientation center. The map should be limited to the immediate area of the corridor itself in scope, -adjacent districts can be indicated within the system directional map.

Position: The map should be mounted parallel to the system and true to its direction when the viewer reads it, and in the same direction as the system directional map.

CORRIDOR MAP: DIAGRAM:

Plate 8-23 follows in the final printing. It is similar to Plcte 8-22- "System Directional Map".

MOVEMENT SYSTEM SIGNING: A certain number of admonitory signs may occur mounted on the movement system surface itself. Without consultation in greater depth with the Engineering Consultants and probable manufacturers, the only firm need identified is "Please Hold Handrail". Other possibilities are "Pass on Left - Hold Handrail", and "Keep to Right - Hold Handrail". The need for such admonitory signs should be established following system operation as such signs can be readily tested for effectiveness. It is recommended that minimum or no signing is preferable unless a clear need can be demonstrated.

Such signing must be highly legible, resistant to abuse, and flush mounted so as not to catch on clothing or articles placed on the equipment surface. Stainless steel is advised.

MISCELLANEOUS SIGNING: Miscellaneous signing will include those warnings, identifications or instructions used thruout the corridor and transportation center for machine rooms, for maintenance facilities, transformer vaults, and at central control facilities. They should be similar in character and of a purely informational nature unless intended for warning. The same typeface should be used thruout. Directional indicators shall be consistently identical.

<u>Materials:</u> Brackets shall be black duranodic where required; plaques shall be acrylic vinyl laminated to acrylic plastic, matt finish, without frames.

<u>Sizes and dimensions:</u> Standard sizes and dimensions should be established for anticipated sign types.

<u>Colour:</u> Colour must be consistent and unobstrusive when used, and definitely subordinate to its context unless delivering a 'warning' message in the traditional red.

SPECIAL CONDITIONS: Special conditions [conditions demonstrated during the course of time due to change or special need] will need to be dealt with on a situational basis as identified. At the present stage of planning, requirements are answered by the 'sign groupings' [terminals, access elements, etc.] proposed, and there appear to be no additional needs. Some guideline should be established, however, for possible variants which may be identified when more is learned about the Transportation Center Segment and possible Corridor extensions. Such should conform in typography, etc. already established unless there is a reason for departure.

Examination of the Transportation Center conditions suggests that signing needs can be dealt with on a basis similar to the Summer Street Segment.

It is evident, however, that the parking garage segment will have a slightly different character because of the very specific function which it will serve, and should be developed with its own particular 'continuity' in mind, while at the same time achieving recognition as part of the same distribution system encountered along Summer Street. This will be achieved in part by continuity of paving, movement system design and finishes, lighting, and terminals. Differences will arise not necessarily in signing types, typeface, design standards, positioning, etc., but in notation, size of typeface, level of illumination and contrast, and more forceful use of colour as appropriate to the physical context served.

Notation will need to be sufficiently large and simple so as to identify 'zones' or 'areas' within the parking structure and assist in orientation by memory. Terminals may be identified simply by number and colour; orientation maps are not necessary until the concourse and general corridor is reached.

Exact communications needs at the Transportation Center will be dependent upon design development of that section of the study.

The section passing through the concourse will pose the greatest difficulties with respect to establishing consistency and identity of the system as a whole.

THE EXACT PURPOSE AND SCOPE OF USE OF A LOGO NEEDS TO BE ESTABLISHED. A LOGO SUCH AS THE MBTA SYSTEM UTILIZES SERVES A VERY EFFECTIVE END, AND UTILIZED EXTENSIVELY THRUOUT THE SYSTEM, IS COMMONLY RECOGNIZED. A LOGO FOR A MOVING WALK IS LIMITED AND VERY SPECIFIC. A LETTER SYMBOL IS TOTALLY INEFFECTIVE UNLESS A SYSTEM IS EXTENSIVE -- AS IS A VISUAL SYMBOL UNLESS IT HAS UNIVERSAL OVERTONES.

THE APPLICATIONS TOWARD WHICH A LOGO MIGHT APPLY ARE [1] THE CORRIDOR ITSELF, AND [2] THE MOVEMENT SYSTEM ALONE. THE CORRIDOR, EVEN IT IT IS ASSIGNED A SPECIAL IDENTITY AS A PLACE, IS STILL A FUNCTION RATHER THAN AN 'END', LIKE, FOR INSTANCE, THE AQUARIUM (WHICH HAS COME TO USE ITS LOGO VERY EFFECTIVELY); THUS, A LOGO IS UNNECESSARY. THE MOVEMENT SYSTEM ITSELF IS AN APPROPRIATE TOPIC -- BUT A LOGO HAS LITTLE SIGNIFICANCE UNLESS THE SYSTEM IS EXTENSIVE OR COMMONPLACE.

ITS APPROPRIATENESS WOULD LIE IN IDENTIFYING TERMINALS AND ACCESS STAIRS TO THE CORRIDOR. IT SHOULD BE USED ONLY CONJOINTLY WITH THE WORDS 'MOVING WALK', AND UNTIL SUCH TIME AS THE CITY ESTABLISHED A POLICY REQUIRING ALL MOVING WALKS UNDER PUBLIC JURISDICTION TO CARRY THE SYMBOL, WOULD MEAN LITTLE. CONSIDERATION OUGHT TO BE GIVEN TO DEVELOPING A SYMBOL AND TERMINOLOGY FOR FINAL DELIVERY MODES ON A GENERALIZED BASIS.

[1] When used with directional indicator, indicator must be located on left side, regardless of direction indicated, at a distance of 2 stroke widths; [2] Indicator and Logo must have same diameter; [3] Diameter determined by 1 stroke width greater than adjacent title, top and bottom; width of diameter must be 1/2 stroke.

Note: Final design must elaborate and expand upon above.

LOGO

PLATE 8-24

TYPEFACE: HELVETICA LIGHT
HELVETICA MEDIUM

SELECTION: THIS FACE HAS BEEN SELECTED FOR ITS SPECIAL QUALITIES OF LEGIBILITY AT ALL SIZES, AND ITS APPROPRIATENESS TO STANDARDS OF LEGIBILITY FOR MOVEMENT SITUATIONS; THE READY AVAILABILITY AS A STANDARD ALPHABET IN VARIOUS MEDIA AND SIZES; AND FOR ITS CONTINUITY WITH TRANSIT SYSTEM GRAPHICS, ALREADY ESTABLISHING A DISTINCT CHARACTER AS APPROPRIATE TO THE DISTRIBUTION FUNCTION.

THE CONSISTENT USE OF A SINGLE TYPEFACE WILL SUBSTANTIALLY REINFORCE THE VISUAL UNITY AND EFFECTIVENESS OF CORRIDOR COMMUNICATIONS.

DEPENDENT UPON CONTEXT, NEGATIVE OR POSITIVE BACKGROUNDS, COLOURS OR SPECIAL CONDITIONS, SPACING BETWEEN LETTERS AND WORDS WILL REQUIRE CAREFUL ATTENTION TO OPTIMIZE LEGIBILITY AND ACUITY, AND COMPENSATE FOR OPTICAL EXPANSION OF BACKLIT LETTERS. SPACING STANDARDS FOR THE VARIOUS CONDITIONS FOLLOW.

abcdefghijklmn
opqrstuvwxyz

ABCDEFGHIJ
KLMNOPQRS
TUVWXYZ

1234567890

HELVETICA LIGHT

abcdefghijklmn
opqrstuvwxyz

ABCDEFGHIJK
LMNOPQRSTU
VWXYZ

1234567890

HELVETICA MEDIUM

Spacing rules from letter to letter and word to word are based upon the optical weight of each letter shape. These should be followed exactly. Note that spacing rules for backlit signs are more open, to compensate for optical expansion, or flare, of backlit letters and words.

General Guidelines:

[1] The spacing rules given on the previous plates must be followed on all signs requiring lettering of 1" cap height or larger. Do not enlarge to these sizes photographically from smaller typeset copy, as spacing will be different and less legible.

[2] For applications requiring smaller than 1", copy may be set in type and ordered from most type compositors, either as printed reproduction proofs from lead type, or as photographic proofs from phototype negatives.

[3] Do not attempt to reproduce lettering by hand at any size, or to cut silk screen stencils by hand. For larger sizes, such as signs and vehicle markings, use die cut pressure sensitive film letters applied directly, or prepare silk screen stencils photographically from finished artwork that has been made up using compositor's proofs, die cut film letters, or transfer wax letters.

[4] Note that Helvetica Medium is available in wax transfer letters (by Letraset or equal in large variety of sizes from most artist supply stores.) These wax letters are not durable, but can be used on temporary signs, for signs not subject to abrasion (such as office doors), for the preparation of artwork, and for lettering on architectural and engineering drawings. Do not attempt to compose lines of copy in very small sizes using these transfer letters, where compositors' proofs can be used with more precise results.

[5] When a change in size is required from proofs or artwork, this should be done exclusively using photographic techniques (film negatives and glossy prints), or photostats (glossy negatives and glossy prints) so as to maintain dimensional accuracy, sharpness, and consistent lettering weight.

[6] Note that the design of almost all items using stacked lines of typography set the lines either flush left or flush right. Do not center lines under each other, except as noted.

ABCDEFGHIJKLMN

OPQRSTUVWXYZ

1234567890&’.,;:-!()

LETTER SPACING

A-A = 1 units
A-C = 2 units
A-S = 3½ units
C-C = 4 units
C-S = 5 units
S-S = 7 units

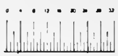
WORD SPACING

A-A = 14 units
A-C = 15 units
A-S = 17 units
C-C = 18 units
C-S = 19 units
S-S = 22 units

(A = angle letter, C = curve letter, S = straight letter)

SCALE OF SPACING UNITS
32 UNITS = CAP HEIGHT

Use clear film sheet with scales for various letter heights.



SPECIAL SPACING CONDITIONS - See PLATE 8-31.

This alphabet is "Helvetica" medium. For applications requiring small sizes, type or proofs can be ordered from most compositors.

Alphabets also available in wax transfer letters by "Letraset" Co. from most artists' or architects' suppliers, and in pre-cut films for pressure sensitive exterior and interior applicat ons.

EXIT TO BUS 21 AND

Note: These standards have been adopted from those used thruout the MBTA [Transit] system for their clarity.

OPAQUE SIGNS - ALPHABET AND SPACING RULES
HELVETICA MEDIUM

ABCDEFGHIJKLM

NOPQRSTUVWXYZ

1234567890&'.,;:-!()

LETTER SPACING

A-A = 1½ units
A-C = 3 units
A-S = 5¼ units
C-C = 6 units
C-S = 7¾ units
S-S = 10½ units

WORD SPACING

A-A = 20 units
A-C = 21 units
A-S = 24 units
C-C = 25 units
C-S = 26 units
S-S = 31 units

(A = angle letter, C = curve letter, S = straight letter)

SCALE OF PACING UNITS
32 UNITS = CAP HEIGHT

Use clear film sheet with scales for various letter heights.

SPECIAL SPACING CONDITIONS: SEE PLATE FOLLOWING

This alphabet is Helvetic Medium. For applications requiring small sizes, type or proofs can be ordered from most compositors.

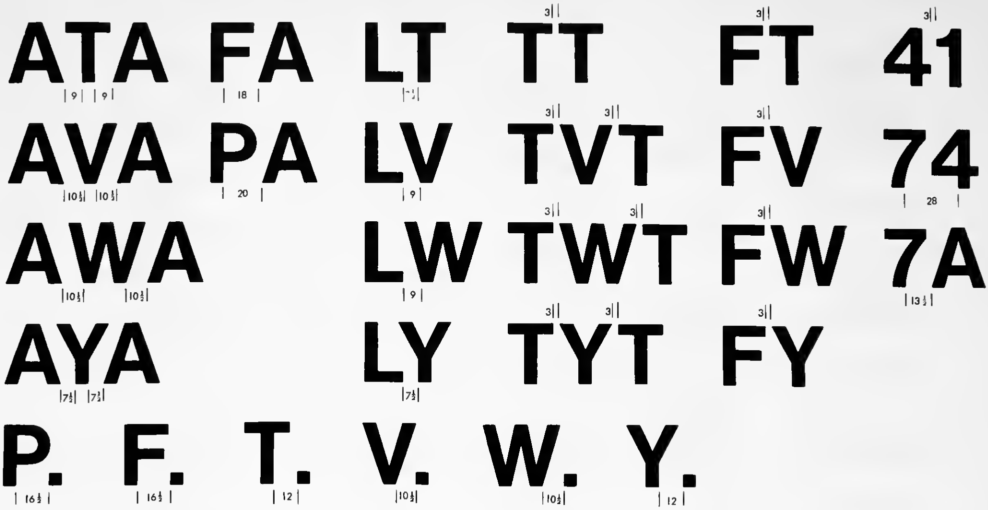
Alphabets also available in wax transfer letters by "Letraset" Co. from most artists' or architects' suppliers, and in pre-cut films for pressure sensitive exterior and interior application.

IT TO BUS 21 AND

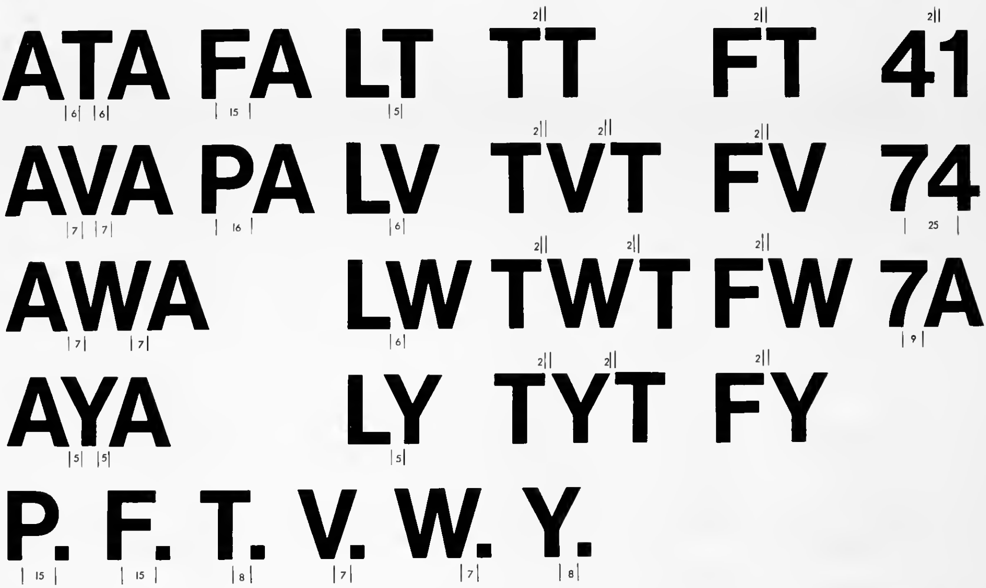
Note: These standards have been adopted from those used hraught the MBTA [Transit]System for their clarity.

BACKLIT SIGNS - ALPHABET AND SPACING RULES
HELVETICA MEDIUM

PLATE 8-30

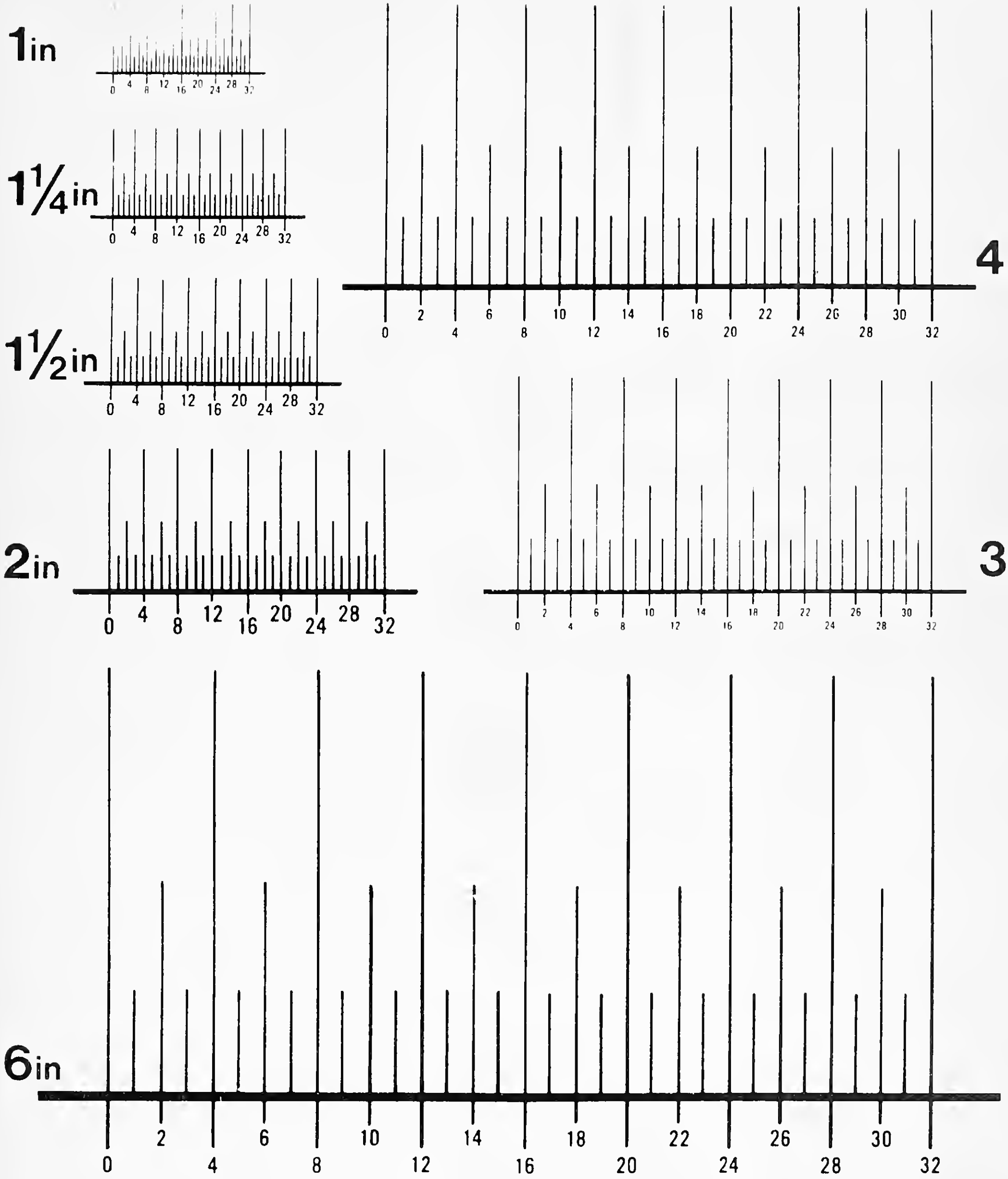


SPECIAL SPACING CONDITIONS - BACKLIT SIGNS
HELVETICA MEDIUM



USE THESE SPACING UNITS WHEREVER THESE COMBINATIONS OCCUR.

SPECIAL SPACING CONDITIONS - OPAQUE SIGNS
HELVETICA MEDIUM



SPACING SCALE FOR
STANDARD CAP HGHT.

PLATE 8-32

THE DIRECTIONAL INDICATOR HAS BEEN SELECTED ON THE BASIS OF THE FOLLOWING CRITERIA FELT IMPORTANT BECAUSE OF THE CORRIDOR FUNCTION. THE INDICATOR SHOULD BE USED CONSISTENTLY THROUGHOUT CORRIDOR SIGNING.

[1] Capable of rotation in all directions without losing legibility;

[2] Clearly legible at considerable distances as a directional indicator, not to be confused with logos or other symbols;

[3] Locate on the side of the message implied by the direction, wherever possible;

[4] Direction: Indicators leading the viewer on in the same direction should take into consideration the context. (1) Point the indicator down if it is intended to draw the attention of the viewer to a terminal entry, or comb plate, for instance, and enlarge the size sufficiently to assist in attracting attention. (2) Point the indicator up if the notation describes a destination beyond the signing point and attention need not be focused on the ground;

[5] The indicator must be effective in both negative and positive background conditions, day or night;

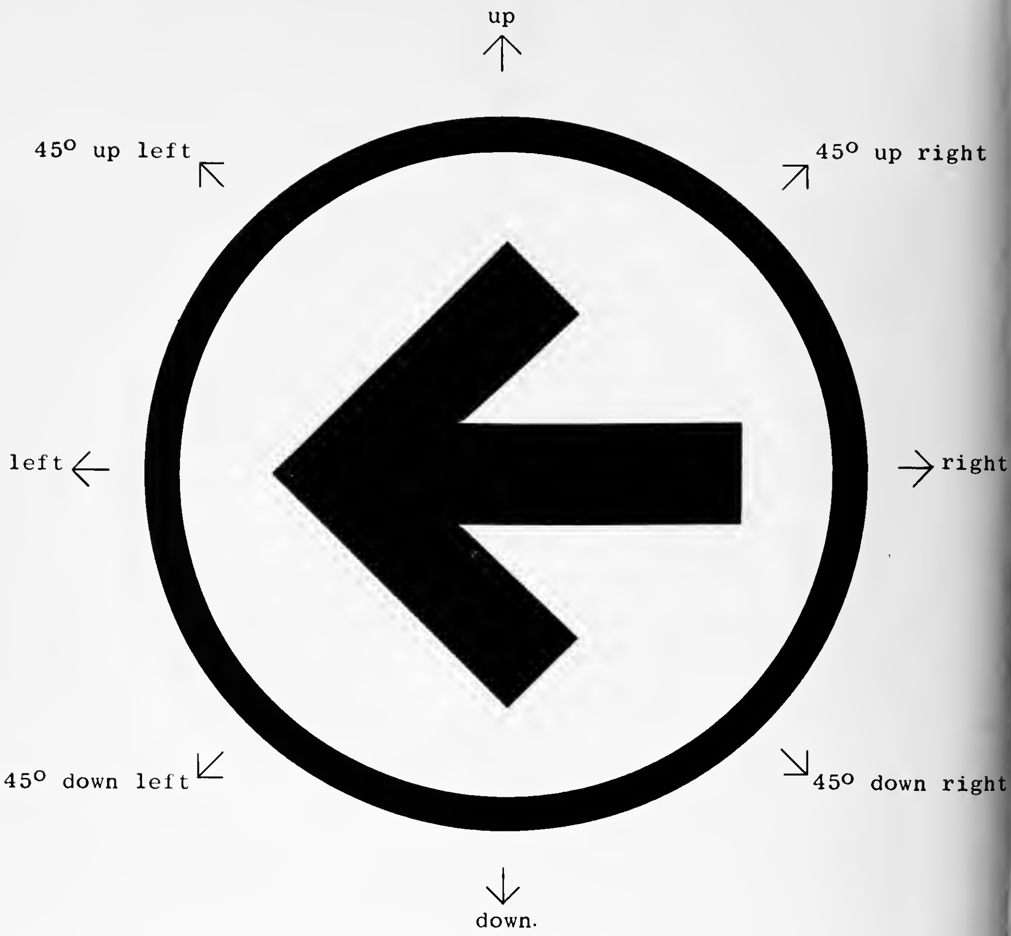
[6] The indicator must be used consistently throughout the system;

[7] Standards must be established to describe width of stroke and position relative to typeface and context.

These are the proper attitude positions for the Arrow/Circle decal. Use the Arrow/Circle either left or right. Do not use on both sides of a sign unless one end or the other is obscured by a column, wall, etc. from some viewing positions.

DIRECTIONAL INDICATOR - CONVENTIONS

PLATE 8-33



Width and stroke for the directional indicator must be exactly the same as that of the message accompanied.

Size of the indicator when used alone without the circle should be equal to the height of the letter adjacent when the indicator is turned at an angle of 45 degrees. When vertical, tail and point should exceed letter height as necessary [see plate opposite].

The circle should be used only for backlit signs, and then must be sized so that the indicator when at 45 degtees is one stroke smaller at both top and bottom than the height of the adjacent letter. The circle should be held exactly 7/10 of its outside diameter away from the nearest message. [Note: The circle should never be used with backlit stencil cut messages.]

DIRECTIONAL INDICATOR- POSITIVE

DIRECTIONAL INDICATOR-NEGATIVE
PLATE 8-35

General: The primary function of corridor colour coding will be to give clear identity and structure to decision points along the route. Consistent coding on a systems wide basis will act significantly in ensuring systems legibility.

Final colour proposals should be a specific shade and hue and will be required to be used consistently throughout the corridor.

It is suggested that use of colour within the Summer Street corridor segment be limited to (I) accent at corridor access points either in the signing itself or on the background surfaces forming the access (such an accent can reinforce access point identity if used consistently); (2) colour as a warning and attention device at movement system terminals; (3) colour in the illuminated backgrounds of signs occurring within the terminal housing if appropriate; (4) the terminal housing itself, requires special consideration inasmuch as design proposals require integration.

Selection of colours is dependent upon examination of perceptual needs and conditions, both day and night, and the establishing of a relationship and distinction from the traditional uses of certain colours within movement system contexts -- e.g., red for warning, or 'stop', etc., and that of the Transit System and city signing interfaces.

Corridor Access Points:

The use of colour at corridor access points as a major communication device will be related to the image of the corridor and the movement system as a whole within the CBD. Consideration ought to be given the relationship of this corridor to other Central Area Distribution prospects.

<u>Application:</u> This colour should be used for Corridor Access Panels, Orientation Maps, Corridor Map, and wherever Corridor graphics needs dictate use of an accent colour.

PLATE 8-36

The use of a strong clear colour such as 'international orange' with no other local associations is recommended as an effective means of establishing and reinforcing the location of the public way of the corridor and at the same time provide a very satisfactory base for directional notations.

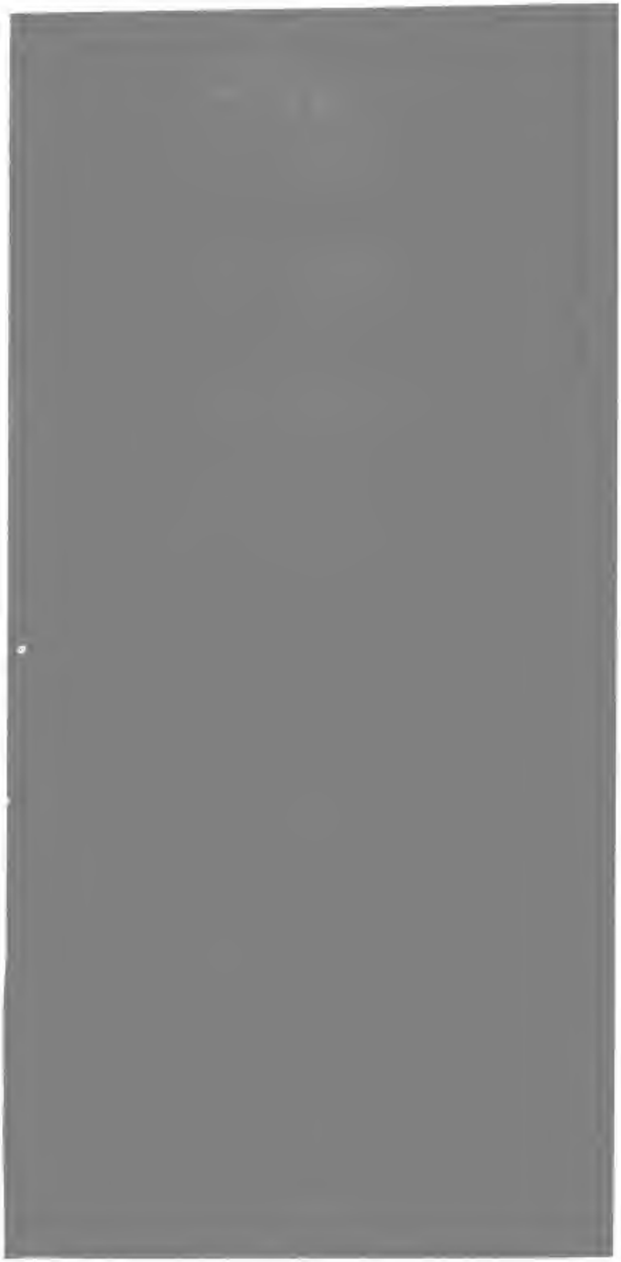
Corridor Materials: The colour system selected is intended as complimentary to and co-ordinated with the overall corridor materials. Paving and movement system surfaces will largely establish the quality and consistency of the total environment, especially as such great distances fall between terminal points.

It is urged that the paving surface approximate the traditional 'Boston red brick', complemented with warm, dark granite inserts. Use of such material and colour will contribute significantly toward establishing the continuity of the corridor itself, in addition to supporting its potential as an integrative element in knitting together the new and old Boston.

Movement system balustrades are recommended black to minimize maintenance and optimize perceptual stability; tops of balustrades are recommended dull, brushed stainless, to visually offset handrails and withstand contact.

Terminal Housing: The Terminal Housing should be painted or anodized a dark bronze or black finish. This is critical in order to minimize distraction within the corridor, and afford a high contrast element within which to both offset and integrate lighting and signing requirements.

COLOUR



Application: This colour should be used only as a worning or admonitory signal: eg.- Terminal Signing " EXIT ONLY".

PLATE 8-37

MATERIALS: PENDING FINAL DESIGN, MATERIALS SHOULD MEET THESE CONSIDERATIONS:

[1] General availability and replaceability over a long period of time;
[2] Resistance to dirt, scratching, breakage and discoloration, exterior exposure and conditions of poor maintenance and public abuse;
[3] Permanence appropriate to the task and to a public place;
[4] Non-reflective surfaces where displaying written material vital to decision making processes.

It is recommended that duranodic framing be used throughout; all backlit stencil cut signs and the terminal housing itself should be of this material. ("Lexan" [trademark] or its equivalent should be used for its unbreakability where illuminated acrylic applies.)

COST: SIGNING COSTS ARE HIGHLY SUBJECT TO FINAL DESIGN DETAILING AND CONTENT. THE FOLLOWING ARE CONSERVATIVE AND ARE TO JAN. 1971. COSTS WERE DEVELOPED ON A SQUARE FOOT BASIS FOR GENERAL TYPE:

Orientation Center: (12 X 24): Single face (no illumination) acrylic with duranodic frame: $80 SF installed.
6 terminals @ $23,000 = $138,000

Typical Corridor Access: 2 signs upper and lower levels (Total 9 SF): single face duranodic frame (8" deep) with stencil cut letter -- backlit. $120 SF installed.
10 primary corridor accesses @ $1080
= $ 10,800

Terminal Signing and Terminal Housing :

(1) Terminal Housing only (24 X48): ($ 18,000)
Note: Environmental and lighting -- Section 6

(2) Exterior single face duranodic frame, stencil backlit:
100 SF @ $120 = ($ 12,000)

(3) Interior: Single face acrylic illuminated with duranodic frame:
275 SF @ $100 = ($ 27,500)

Terminal Signing and Housing Total: ($ 57,500)
6 terminals @ $57,500 = $345,000
Miscellaneous Signing Allowance $ 10,000

PRELIMINARY ESTIMATE --
PRIMARY CORRIDOR: TOTAL = $503,800

LEGAL: EXACT CONTENT AND WORDING OF NOTATIONS SHOULD BE CAREFULLY REVIEWED BY THE AUTHORITY, AND LEGAL OPINION SOUGHT AS TO WHICH MESSAGES MIGHT BECOME POINTS OF ISSUE.

Little is presently known about processes of interpretation, reaction, negative or positive understanding, to written stimuli. The graphics proposal set out to anticipate possible interpretations, minimize the number of written messages, and make them as explicit as possible. Planning for the graphics system has developed in such a way, however, to be permissive of adjustments as the need becomes apparent. It is recommended that after the system is in operation, users be polled to determine the effectiveness of notations. This method has been employed successfully in highway signing.

The most probable area of misinterpretation appears to be those messages posted on the movement system itself, advising the user as to his behavioural responses -- e.g., "Step to the Right and Hold Handrail". A simple approach is to eliminate or minimize such messages on the premise that no message leaves no grounds for misunderstanding. Particular messages of this nature, however, can be tested for their contribution to the most effective operation of the system, and users can be polled for their reactions to various wordings.

Section 9

APPENDIX

Table of Contents:

THE HANDICAPPED: GENERAL: AS A PUBLIC R.O.W. SERVING THE GENERAL CITY POPULATION, THE CORRIDOR CANNOT BE CLOSED TO THE HANDICAPPED. ALTHOUTH THE MOVEMENT SYSTEM ITSELF MAY NOT RECEIVE A CERTAIN PERCENTILE OF USERS, THE CORRIDOR CANNOT BE RESTRICTIVE, ESPECIALLY AS IT CONSTITUTES A MAJOR IMPROVEMENT OVER THE STREET - CURB CONTEXT IN OFFERING RELATIVE EASE AND SAFETY OF MOVEMENT TO THIS USER.

PERCENTAGE OF THE POPULATION:
Jackson & Moreland: "Approximately 3% of the total population suffer appreciable mobility limitation and must be considered in terms of design." " Of these individuals, approximately half are 65 years old or more even though that age bracket constitutes only 9% or so of the total population."

Traffic Consultants: Traffic studies indicate that 60% of the present pedestrians had no impediment to movement whatsoever. Another 38% were carrying small packages which required the use of one hand. Another 2 1/2% were carrying large packages which required the use of both hands. The total number of persons walking with or carrying an infant, pushing handtrucks, walking with the aid of crutches, or having some other impediment was only 29 in 3000 or approximately 1% of the total flow. Twelve of these 29 persons were classified in the "other" category and consisted of primarily elderly persons having some difficulty in walking. No wheelchairs or baby carriages were observed during the period of the count."

DEPARTMENT OF SAFETY: Department of Safety Code defines the handicapped as a "person confined to a wheelchair, a person who because of the loss of a foot or leg or because of an arthritic, spastic, pulmonary or cardiac condition or palsey, a person who is blind or whose sight is so impaired that, functioning in a public area he is insecure or exposed to danger, a person whose hearing is so impaired that he is unable to hear warning signals, and a person whose mobility, flexibility, coordination and perceptiveness are significantly reduced by aging."

Code specifically directs its requirements toward public buildings, ramps, walks [exterior pathway with a prepared surface placed at existing ground level], remodelling or alteration as applied to a structure. Ramps shall be a maximum of 10% slope.

APPROACH AND RECOMMENDATIONS:
It is necessary to determine or establish the 'threshold' of user mobility for which the corridor should be designed, i.e., which handicapped that Corridor is expected to accommodate or exclude.

Assumptions: Pending establishing of criteria by the City, Corridor planning has proceeded on these assumptions:

[1] the 1.5% of the population with appreciable mobility limitation [assuming the other 1.5% to be the elderly] are unlikely to be traversing considerable distances or are institutionalized;

[2] the corridor does not constitute a 'publid destination', but a public way abutting commercial properties, to which access can be achieved at normal street level so as to permit negotiating vertical distribution systems, gaining access if necessary into the corridor;

[3] an alternate route exists for this 1.5% at the normal street level [negotiating ramps at 10% to reach a level 16 to 20 feet above may constitute greater hazard and difficulty in this case than the curb at the street; and

[4] the transit system does not presently accommodate the handicapped. Their most probable delivery mode would be car to the point of destination.

Corridor Planning: Corridor planning has proceeded on the assumption that persons able to negotiate the present transport modes will be able to negotiate the corridor, at least the pedestrian way if not the movement system. A choice of continuous walking mode must be established the length of the Corridor for those choosing not to use the system in addition to the handicapped.

The height of the Corridor above the street necessitated by clearance and other constraints suggests that ramps as a means of access for the handicapped would be excessively long [60 to 200 feet at 10% max.], not only physically strenuous to traverse but exerting considerable impact on the R.O.W., and that this means of access should be limited to those areas where the natural physical context minimizes length of run or provides the necessary space. A small elevator may in terms of space and cost be more appropriate. Those handicapped most likely to use a ramp might be the wheelchair operant, and the paraplegic -- ramps are as much a barrier to the aged, the cardiac, as stairs. The blind are not restricted by stairs. For these users street level access into buildings offers an alternative. The handicapped user most likely then to be using the Corridor would appear to originate at its extremities, offsetting initial effort by long distance travel convenience and safety -- using the Corridor as a travel route rather than a destination. These extremities are receptive of ramping devices or elevators. Ramps or access devices at such points should be clearly identified and an orientation map describing the Corridor to the user about to enter be posted to advise him of frequency of exit and the appropriateness of the route to his purpose.

Extremities which could receive ramps or elevators are [1] the Mall, [2] Transportation Center, [3] Congress Street Extension (Financial District0, [4] Dewey Square, [5] the Channel Extension. These points would establish generalized points of access for those who for some reason must absolutely negotiate the Corridor. The Transportation Center plans presently indicate a ramping element; the Mall at the other extremity of the Corridor could receive a ramp with special planning on the part of the developer of parcel C-3. The Transit should certainly be encouraged to participate in providing an elevator connection between all levels at this location -- whether in conjunction with parcel C-3 or at the D-1 site while ease of construction permits. [Elevators are available at the Transportation Center site.]

Recommendations:

[1] The ramp porposed at the Transportation Center should be designed for a maximum slope of 10% so as to serve the handicapped;

[2] Elevators connecting all levels at the Transportation Center should be permissive of serving the handicapped user;

[3] The Chauncy Street corner and the Mall connection should be carefully examined at the time that these parcels are developed in order to examine the feasibility of incorporating ramps or elevators in either parcels D-1 or C-3, -- C-3 being most logical in terms of serving the Mall.

Pedestrian Corridor planning as a whole has proceeded with normal respect for Code requirements and clearances.

INTEGRATION OF A MOVEMENT SYSTEM WITH THE NORMAL WALKING MODE PRESENTS JUXTAPOSITIONS OF DIFFERENT VISUAL-VESTIBULAR OR PERCEPTUAL CONCERNS. THE ENGINEERING CONSULTANTS HAVE BEGUN TO IDENTIFY THESE AREAS RELATIVE TO THE MOVEMENT SYSTEM. NO CLEAR UNDERSTANDING OF THE INTERFACE OF MODES OTHERWISE HAS BEEN ESTABLISHED, PRIMARILY BECAUSE OF THE STATE OF THE ART. THE DESIGN CONSULTANT IS PARTICULARLY CONCERNED WITH THIS INTERFACE. PRIME IMPORTANCE SHOULD BE ASSIGNED THE NEEDS FOR ORIENTATION AND ATTENTION SEQUENCES IN ORDER TO INTEGRATE NATURALLY ALL CORRIDOR ELEMENTS.

PLANNING TO DATE HAS ATTEMPTED TO RECOGNIZE THE FOLLOWING CONCERNS DELINEATED BY THE ENGINEERING CONSULTANTS [JACKSON & MORELAND]. THEY SHOULD FORM THE BASIS FOR AN ON-GOING EXAMINATION DURING FINAL CORRIDOR PLANNING: [Extracted]

<u>VISUAL-VESTIBULAR:</u> "Among primary human objectives demanding attention from other moving walk system elements, for example, access [station] points are:

[1] Orderly visual atmosphere both on the moving walk and at the access points to avoid pedestrian disorientation and illusory effects and to assure observation of important information devices;

[2] Simple, clear aids to orientation of pedestrians, orientation graphics, maps and directional signs, etc.;

[3] Clear walking routes within the access points, identification of where the service is, and other required basic elements of information;

[4] Lighting to accent combplates and belt surfaces or any other surface requiring attention by pedestrians with poor visual acuity;

[5] Public address systems and closed circuit television monitoring for pedestrian security and detection of system malfunction;

[6] Ramps and elevators for disabled persons to allow them to reach the elevated moving walkway;

[7] Adequate space at access and exit station platforms.

VISUAL-PERCEPTUAL: [Jackson & Moreland]

[1] Treads and Base Structure: Treads and base structure should be kept visually dark enough to prevent the 'free-floating' feeling due to moving walk motion;

[2] Orientation: Provision should be made between belts for a structure or ornamentation which will relate passengers to the ground in spite of motion of passengers on other adjacent moving belts [i.e., columns]. This feature should interfere as little as possible with the open view out of the moving walk.

CONSIDERATIONS OR CRITERIA: [Jackson & Moreland]

Stable Frames of Reference: Provision of stable frames of reference so that a person's orientation does not change radically as he shifts gaze from one component of the system to another so as to minimize illusory effects and contribute to system stability acceptability.

User Confidence: Generated by sense of 'stability' -- implication that there will be experienced no loss of support and equilibrium.

Sidewalks moving in opposite directions: When sidewalks move in opposite directions within close proximity to the stationary environment, the visual array becomes very complex and probability of producing inappropriate illusions becomes very high. Further perceptual confusion is added when the user walks within such visual environment because the person's motor actions are accompanied by visual feedback and vestibular signals foreign to his previous experience.

Age: Increasing age introduces important factors other than mobility limitations which have important implications for the design of a moving sidewalk. It has been shown that increased age brings a slowing of performance, an increase in signal processing time, an increase in decision time, a decrease in step length, a decrease in speed of walking, etc.

Directional Signals: Design and locate so as to minimize cognitive processing of information required of user and assist him in decision making process.

Speed Cues: Provide sufficient clues as to speed of belt. This is important so that the user can adjust walking speed to facilitate transition from one element to another, -- e.g., sufficient pattern or texture in belt surface to be readily perceived as moving at the speed which it is moving. On the other hand, unpatterned surfaces are recommended for oscillating systems so as to minimize visual 'shimmer' such surfaces seem to present.

Attention - Access/Egress Points: Attention orientation devices such as increased illumination and graphics to signal approach of terminals and decision points should be utilized and a high level of illumination established at grade to draw attention and point to hazards, such as combplates.

SUMMARY: PRELIMINARY STUDIES: PHASE I

Using primarily graphic techniques, Phase I Preliminary Studies outlined the basic parameters, constraints and potential of the system:

The site analysis indicated basic climatological characteristics important to the success of the pedestrian system, and three particularly undesirable visual orientations at the central artery and at the terminus of the Massachusetts Turnpike. Three horizontal corridor alignment positions within the study area were briefly developed: (1) Adjacent to Summer Street for the full distance to Atlantic Avenue; (2) Adjacent to Summer Street then South of Dewey Square to Essex, adjacent to Essex to Atlantic; (3) Interior of block along Summer, adjacent to Essex to Atlantic.

Pedestrians were assigned the second level with the movement system at either the second level or at the third level.

The report established, for purposes of analysis, user zones (similar to land use diagrams but here intended to identify the user, i.e., 'client'). The three alignment positions were then tested against the 'client users' and their origin and destination characteristics. Based on information at the time of the report, alignment No. 2 was proposed as meeting both environmental and visual criteria and as showing economic potential in terms of development-expansion. Further examination during the subsequent work order proved the alignment unacceptable on the basis of system continuity.

STATUS AT THE CONCLUSION OF WORK ORDER NO. 2:

Critique by the BRA, Transportation Consultant, Engineering Consultants, and Architects established the following list of variables to be incorporated into continued planning efforts. These variables necessarily influenced the

types of choices which could be made and dictated certain 'flexibility' of planning so as to permit simultaneous options until such time as they could be resolved.

Movement Systems: Planning of the elevated pedestrian corridor continued to include any one of these four movement system types:
[1] Conventional moving belt;
[2] Multiple belts - Linear Array (accelerated system);
[3] Constant linear accelerated system ;
[4] Side-loading oscillating elastic apron.
Planning for an accelerated system exercised certain specific constraints upon design development.

Corridor Alignment Position: The interior block corridor alignment was discarded leaving two horizontal alignment alternates at Summer Street.

Street Alignment:
Planning studies were to continue on the basis of Summer Street alignment 'B' (straight alignment rather than the street alignment 'A' upon which the work orders had proceeded up until then. Street alignment was seen to have a decided effect upon corridor planning and bridge connection possibilities and it was identified as essential to a moving walk system that a straight street alignment be developed.

Centrose Tower Grid Operation: The grid orientation of the Centrose Tower is of critical importance to the corridor and movement system in any alignment alternate. Selection of corridor alignment alternate greatly influences tower grid orientation and vice versa.

Vertical Alignment of Movement System: Due to difficulty in meeting the suggested volume requirements and providing the resultant number of belts within a reasonable R.O.W.-- a third level movement system remains an alternative.

Pedestrian Traffic Studies: Simultaneity of traffic studies with design development necessitated certain assumptions on the part of the design development.

Federal Reserve and Dewey Square: Further examination of the role of the Federal Reserve, Dewey Square and the Financial District was indicated.

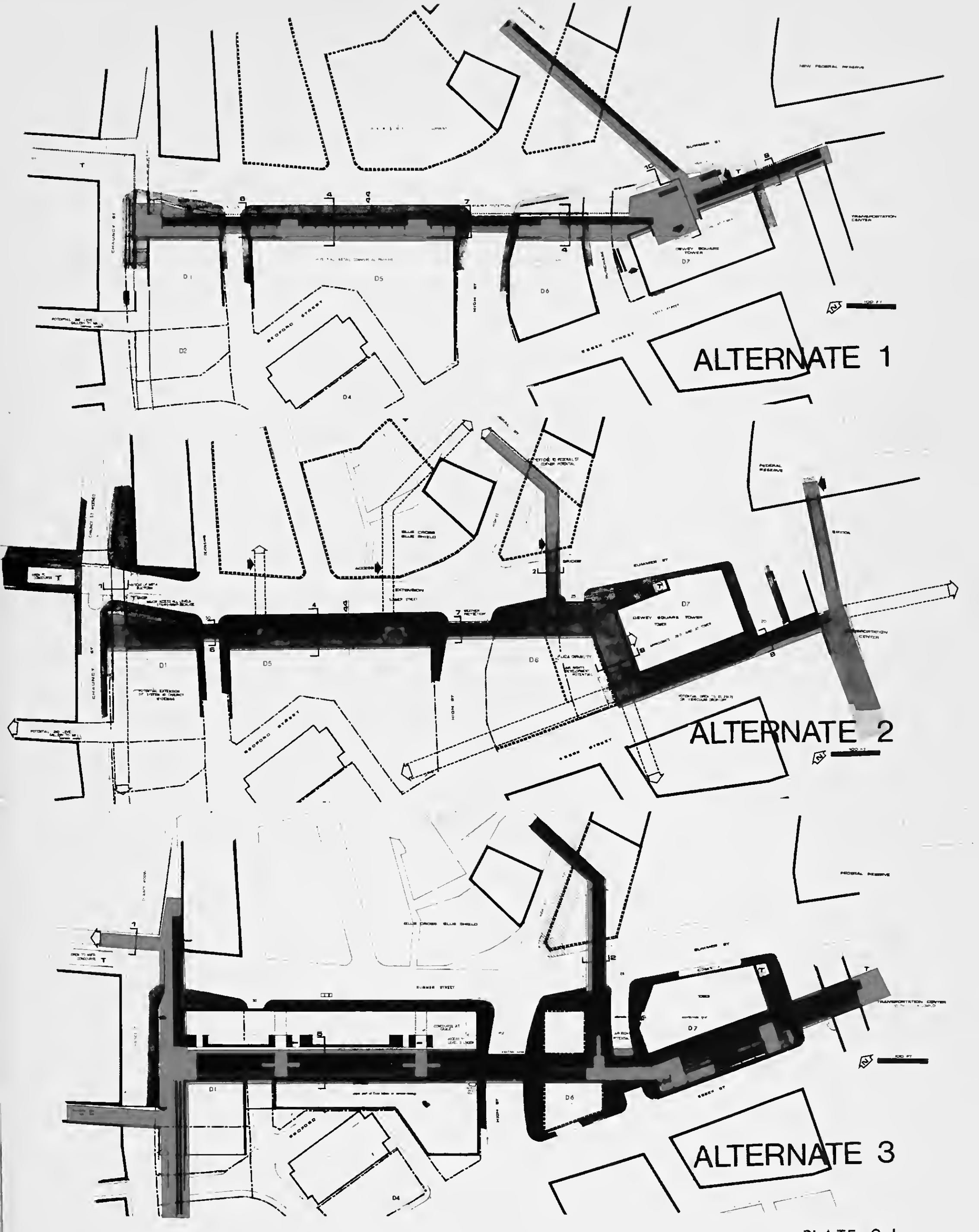

ALTERNATE 1
DEWEY SQUARE TOWER
TRANSPORTATION CENTER
NEW FEDERAL RESERVE
ALTERNATE 2
BLUE CROSS BLUE SHIELD
FEDERAL RESERVE
ALTERNATE 3
BLUE CROSS BLUE SHIELD
TRANSPORTATION CENTER
FEDERAL RESERVE

PLATE 9-1

SUMMARY - PRELIMINARY STUDIES: PHASE 2:

SOUTH STATION CORRIDOR: Development and study of the South Station Corridor element was seen to be largely dependent upon preliminary plan studies of the entire complex by its architects, and although preliminary considerations or comments were presented in this report, further study of this element was recommended delayed until transportation center studies were resumed.

The corridor was identified as consisting of 2 segments:
[1] Transportation Center concourse, with 2 connections to the Summer Street Corridor; [2] Parking Structure segment, with 2 alignment alternatives: edge and interior.

Transportation Center connection alternates could be answered prior to re-design pending selection of Summer Street Corridor alignment alternates 1 or 2 and Parking Structure alignment alternatives could be resolved by establishing overall priorities such as autonomy and control, accessibility expected from garage to Leather District, walking distance, and public R.O.W. The design consultant was advised to proceed with development of edge alignment.

SUMMER STREET CORRIDOR: Work Order #3 identified and presented 2 alignment alternates for consideration and selection, recommended movement system, and presented 2 alternatives for its vertical alignment.

Design development was proposed on a modular basis, permissive of existing contextural variables.

Street Alignment - Summer Street: Planning was based upon street alignment B dated 5/2/68 shifting street position to the south of its present position at Atlantic Avenue. Deviation from this alignment was seen to affect bridge connec-

tion possibilities, corridor angle, High Street connection at parcels D5 and D6 and connection to the Transportation Center. A straight alignment is most desirable in meeting movement constraints.

Corridor Extension: It was recommended that consideration be given to the extension capability of the Corridor beyond study area boundaries, and this study be regarded as an initial increment in a well-integrated 1st and 2nd level pedestrian network in the City.

Alignment Alternate Selection: Alignment selection was identified as dependent upon (1) the City's priorities and objectives for growth and development of the CBD; (2) committment to detailed analysis of the pedestrian corridor.

The corridor alignment could:(1) appreciably influence channel development; (2) establish ease of access to the financial district-north, and (3) anticipate CADS extension capability and clarity. Intentions and priorities need to be stated in order to establish a basis for selection or recommendation of alignment alternates.

Horizontal R.O.W.: 40-44 ft.: Final definition of horizontal R.O.W. was seen to be dependent upon (1) selection of movement system and its exact width, and (2) final proposal for structural connections between columns to receive bridges.

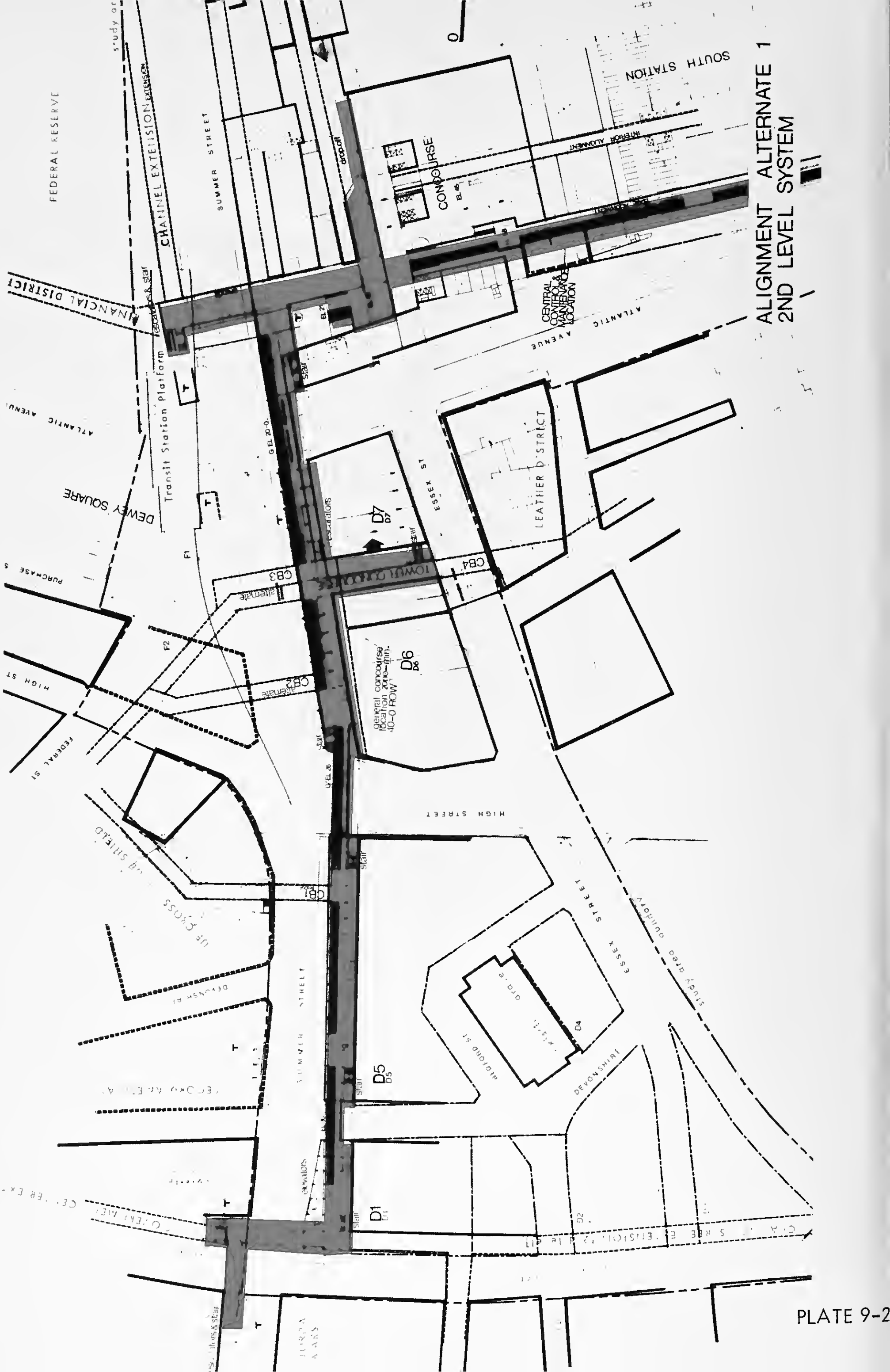
Vertical R.O.W. and elevation of pedestrian level: Vertical elevations in the R.O.W. were dependent upon (1) final selection of movement system, (2) requirements for service tunnel under equipment of 3rd level system alternate, and (3) final definition of structure depth for spanning streets (minor)

These variables had greatest implications for parcels D1 and D5 in establishing their constraints. Vertical elevations at the Centrose Tower and transportation center are not appreciably affected due to the natural slope in site and the traffic generating concourse elevation at the transportation center.

Movement System Selection: Movement system selection was critical in implementing final planning.

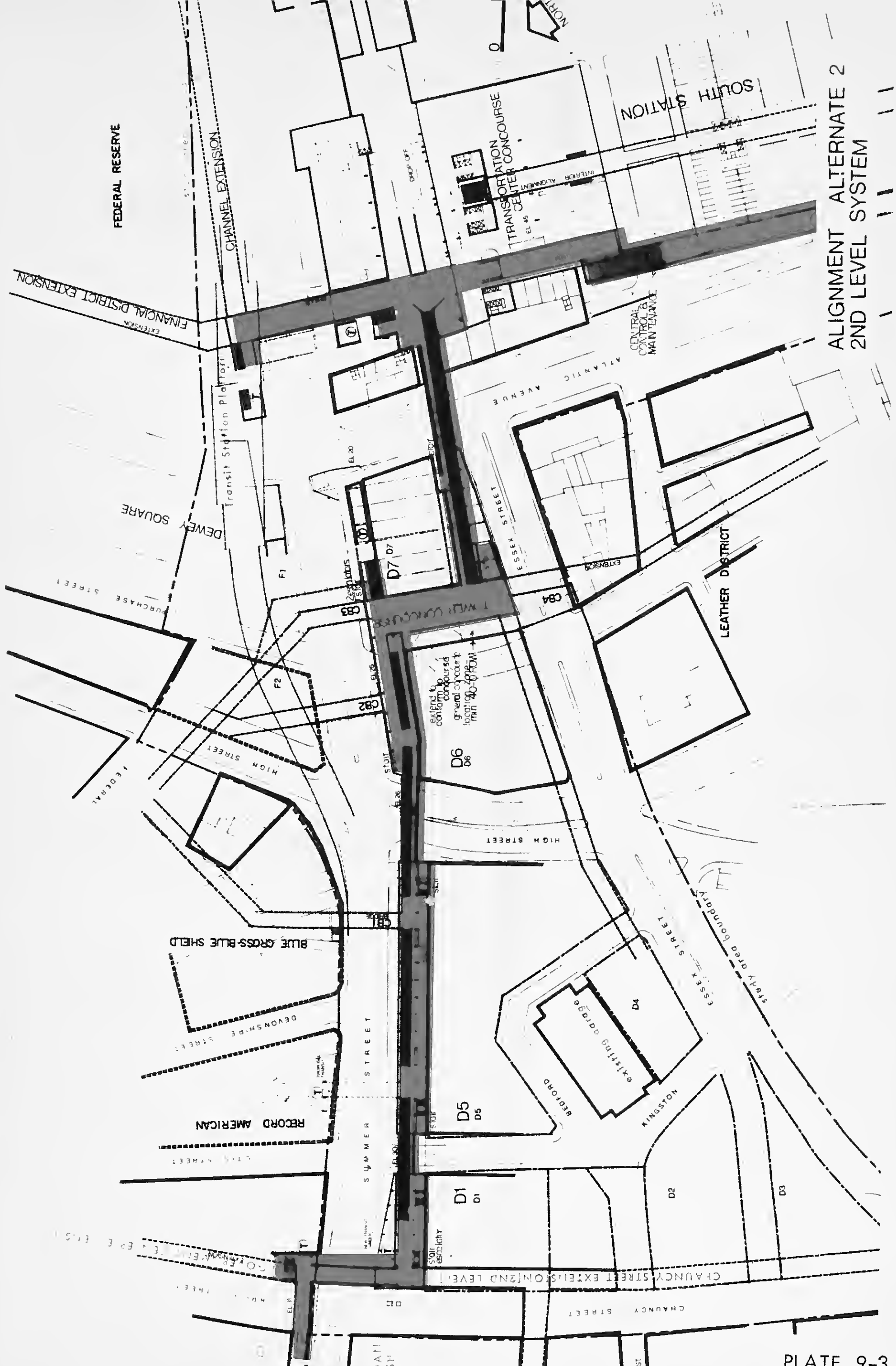
Movement System Availability: Should accelerated speed moving wall systems not prove immediately feasible technologically and a period of waiting be required and/or improved or alternate solutions become available during the waiting period, it was recommended that the pedestrian corridor itself be constructed with provision both to receive a moving walk system and sufficient vertical clearance to anticipate alternative movers.

Corridor Impact: It was strongly urged that the City, in the event that a mechanical movement system does not seem feasible, most seriously consider planning and construction of a 2nd level pedestrian network with its abilities to respond to CBD and CADS basic objectives immediately. It is particularly timely that such network be initiated during this period of growth and change in the City.



ALIGNMENT ALTERNATE 1
2ND LEVEL SYSTEM

PLATE 9-2



ALIGNMENT ALTERNATE 2
2ND LEVEL SYSTEM

PLATE 9-3

ALIGNMENT ALTERNATE SELECTION:

Alignment selection was identified as dependent upon (1) the City's priorities and objectives for growth and development of the CBD, and (2) committment to detailed analysis of the pedestrian Corridor.

The Corridor alignment can (1) appreciably influence channel development, (2) establish ease of access to the financial district north and its development, (3) influence leather district development, and (4) anticipate CADS extension capability and clarity. Intentions and priorities required clarification, in order to establish a basis for selection or recommendation of alignment alternate.

Essential differences between alignments 1 and 2 arise from their point of connection to the Transportation Center and route through Centrose Tower.

Alignment 1: (Summer Street)
The alignment 1 connection to the Transportation Center suggests a major pedestrian terminus with potential for extension and access to the channel anticipating its development. This connection may or may not integrate with the building envelope depending upon the extent of Center redesign required and the exact street alignment. It establishes a decided pedestrian arrival point and transition between pedestrian levels, requiring distinct and specific design analysis by the architect of the Transportation Center, above and beyond the needs of program so as to accommodate the Corridor, in addition to careful coordination with the architects of the Federal Reserve across the street.

The alignment provides strong access potential to the northernmost part of the financial district, but necessitates recognition of the leather district via additional pedestrian concourse through the Centrose Tower. (It should be noted that this district receives some possible exposure via Atlantic Avenue edge alignment of the Transportation Center Corridor should it be selected.

The prominence lent to Dewey Square by this alignment suggested that the city feel obliged to encourage and implement development of the platform north of Summer Street above the Central Artery. Dewey Square can become either a major open space land-bank for the city, with focal point to the new Keystone Building, serving the financial district pedestrian as well as its abutters, or a new low-rise structure.

Alignment 2 (Summer-Essex Streets)
This alignment does not respond as directly to the financial district potential or the channel, but did lend greater impetus to leather district development if the interior garage alignment was selected.

It could be incorporated within new buildings along its route as presently developed without major program changes; however, this did not permit continuity of movement system.

Dewey Square: Alignment position dictates building configuration. Transit station connection, pedestrian concourse to the leather district, and Corridor position place constraint and influence upon the character of the building's pedestrian level.

It was recommended that a concourse be provided to the leather district regardless of alignment if the Corridor were intended to respond to this sub-area.

Alignment connections to the Transportation Center required evaluation for correspondence to long range objectives for supplementary service throughout the CBD and abutting areas.

MOVEMENT SYSTEM: COMPARISON:
ALIGNMENT ALTERNATES 1 AND 2:

Number of Belt Segments: No difference in number of belt segments between alignment alternates 1 and 2. This is a function of access-egress desire points.

Length of Each Belt Segment: Length of segments overall were essentially within 10-20 feet of each other for the 2 alignments. Alignment 2 might be supplemented by an additional 60 foot segment in order to minimize walking distance for system user at the concourse, but such a segment was strongly advised against.

Number of Belts: No difference. Second level system was proposed as having 2 belts; the third level, three belts.

Location of Belts Within the Enclosed Space: Similar relationship with the exception of the Centrose Plaza transfer if this segment is included.

Corridor Access Configuration: One additional access point to corridor required for alternate 2 at the Atlantic Avenue crossing.

ALIGNMENT ALTERNATE COMPARISON
PEDESTRIAN TRIPS WELL SERVED/POORLY SERVED

TRIP	ALIGNMENT ALTERNATE I [Straight Alignment] Well Served	ALIGNMENT ALTERNATE I [Straight Alignment] Poorly Served	ALIGNMENT ALTERNATE 2 [Jogged Alignment] Well Served	ALIGNMENT ALTERNATE 2 [Jogged Alignment] Poorly Served
TRANSPORTATION CENTER [Bus-Rail-Vehicle] [I] Commuter to and from Retail Core and Beacon Hill:	O		O	
[2] Potential Commuter between Transportation Center [bus-rail-car] and Government Center--Blue line:	O [potential only]	[Not at all unless extended]	O [potential only]	[Not at all unless extended]
[3] Shopper between Transportation Center [bus-rail-car], Corridor or Retail Core destination:	O		O	
TRANSIT: SOUTH STATION KIOSK [I] Commuter from Red line south origina to Corridor, Retail Core, or Beacon Hill:	O		O	
[2] Shopper from Red line, South origin with Retail Core or Corridor Destination:	O		O	
TRANSIT: ORANGE - GREEN LINES Transit users, Orange or Green line with destinations in Corridor or remote Financial District [Federal Reserve or Channel] or Trade Mart and South Station:	O			O [Federal Reserve and Trade Mart indirectly served] [South Station well-served]
Proposed Transportation Center Hotel:	O			[Indirect] O
SURFACE USERS: Surface traffic from immediately abutting areas [traverse inter-area traffic of sufficient distance to warrant use of 2nd level to avoid traffic conflicts and improve time]:	varies	varies	varies	varies

IRD LEVEL MOVEMENT SYSTEM:

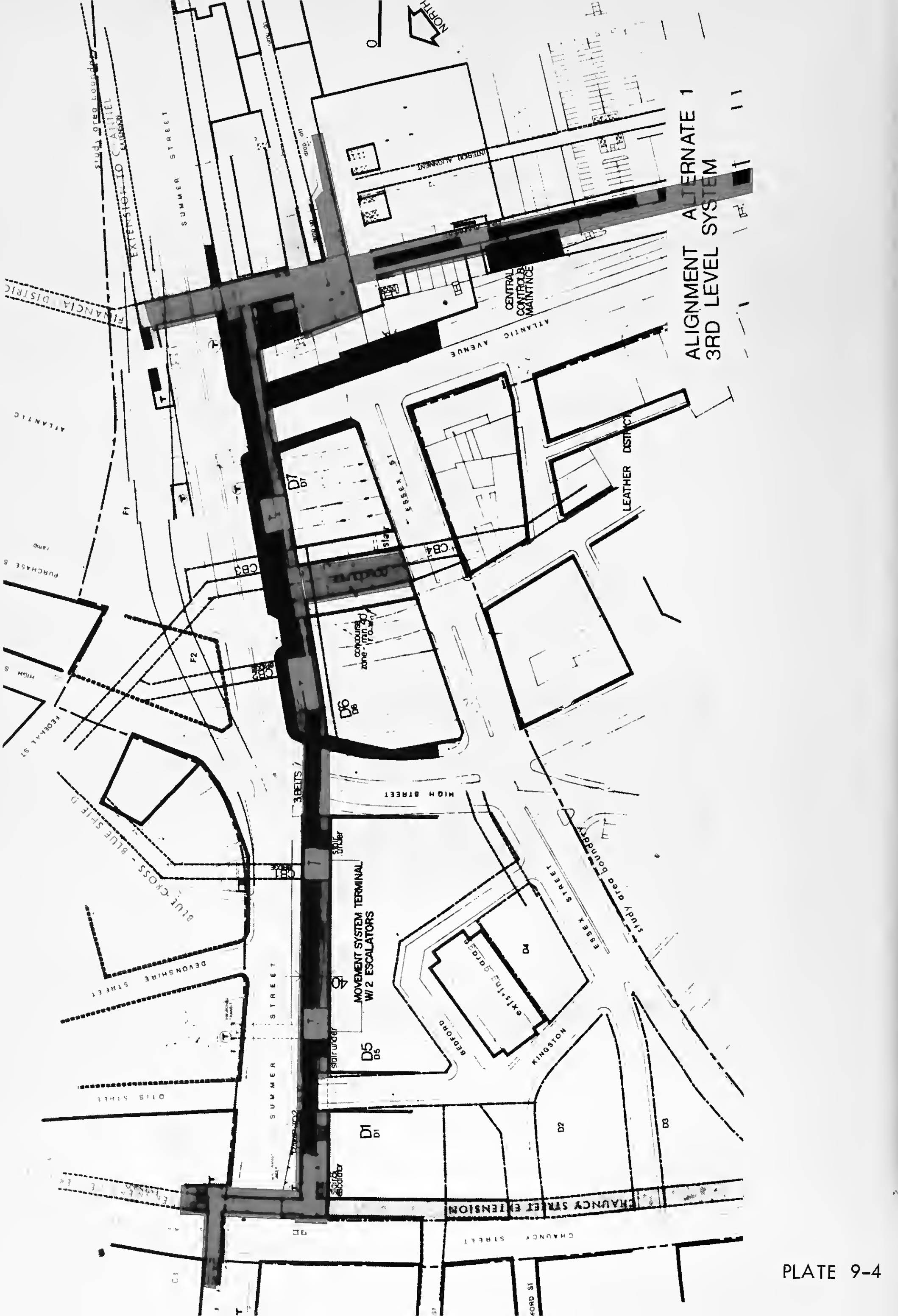
:ause the Corridor was clearly an environment which the movement system dominated, and walking pedestrian could not approach the je except at terminals which are areas of ense pedestrian passage and distribution.

various environment reasons the possibility locating the movement system at a level ove a second level continuous pedestrian ridor was examined.

: Corridor, whether it housed 2 or 3 belts, s clearly an environment in which the movent system dominated. The walking pedestri- could not approach the edge except at termis -- areas of intense pedestrian passage and tribution. Terminals were identified as as which focused pedestrian decision points, ssover conflicts and possible congestion and ard -- in addition to forming the transition ween the machine and walking mode. The nber of possible pedestrian conflicts from de-ion needs could be reduced from 34 to 17. pedestrian using the movement system itself ild be separated from the visual distraction he walking pedestrian alongside with pos-e perceptual difficulties -- and his atten- could be focused on decision points. An vated system could be continuously weather tected at the street side without closing the nary corridor itself thru which it passed.

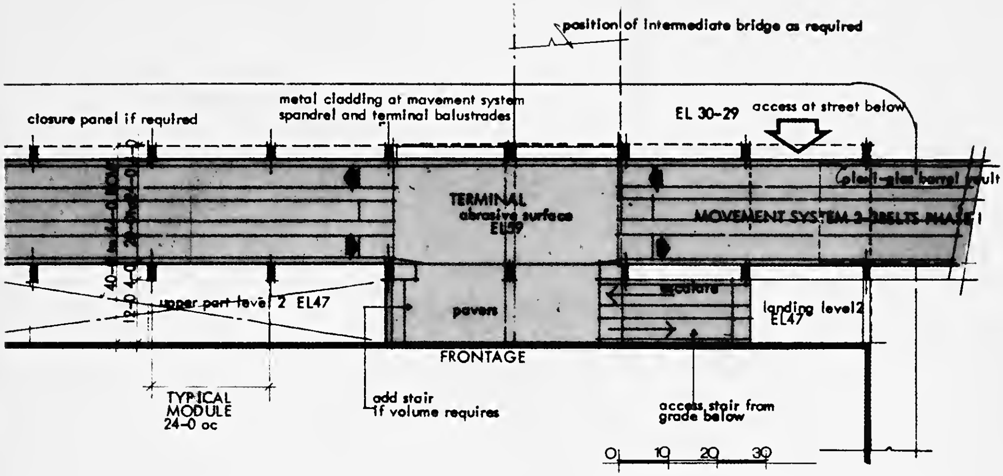
vice access to the system was recommended ieved by use of a cart traveling at the pri-y Corridor level and removing panels in a tinuous access closure at the bottom of the em. This precluded the necessity to employ lers at streets or areas of limited height. Ma-ne rooms were to be located at street level.

cement of the system at a 3rd level minimized).W. requirements to 40-0, and was permis- of inclusion of advanced technology as it ame available. It was recommended that this placement be given careful consideration in light of its environment implications, R.O.W. benefits, and ability to optimize a movement system context. Costs, with final definition of R.O.W. were competitive. The position was felt valid if emphasis was upon development of a Summer Street pedestrian Corridor served by a mechanical mode. Transportation Center connections were particularly convenient.

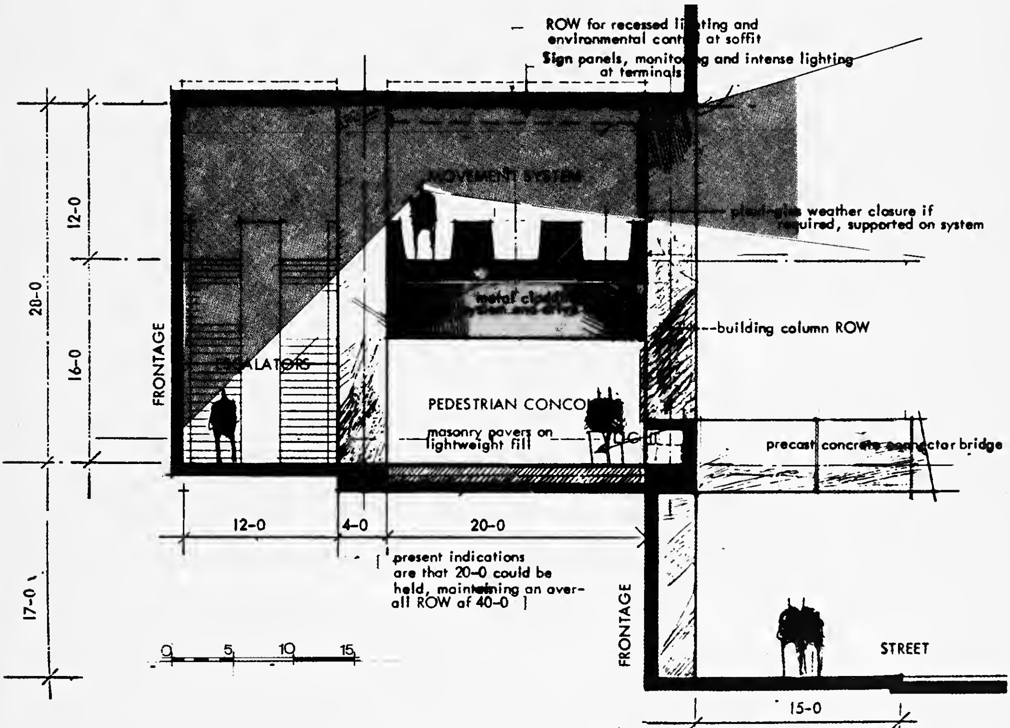


NORTH
ALIGNMENT ALTERNATE 1
3RD LEVEL SYSTEM
CENTRAL CONTROL & MAINT'NCE
ATLANTIC AVENUE
SUMMER STREET
ESSEX ST
LEATHER DISTRICT
D7
CB4
CB3
D6
HIGH STREET
3 BELTS
MOVEMENT SYSTEM TERMINAL W/ 2 ESCALATORS
D5
D1
D2
D3
D4
BEDFORD
KINGSTON
ESSEX STREET
study area boundary
CHAUNCY STREET EXTENSION
CHAUNCY STREET
DEVONSHIRE STREET
OTIS STREET
FEDERAL ST
F1
F2

PLATE 9–4

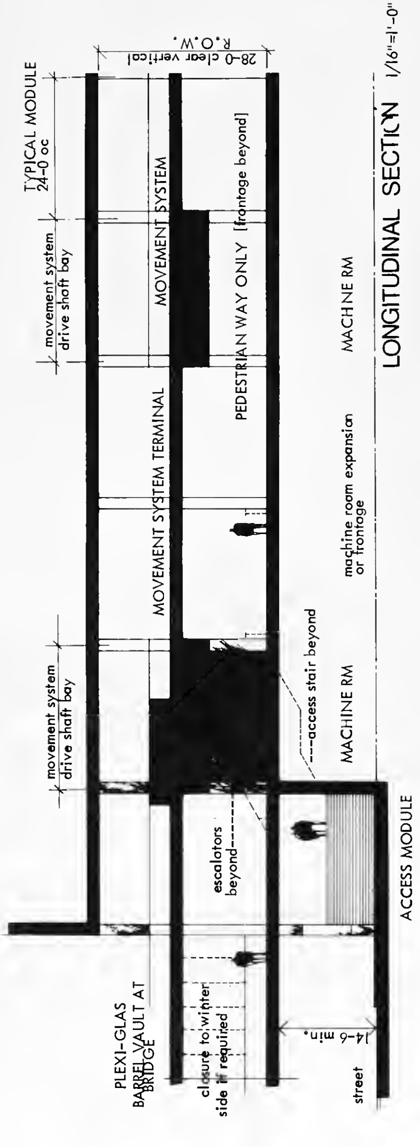


PLAN-3RD LEVEL
TYPICAL MOVEMENT SYSTEM
ACCESS TERMINAL 1"= 20'-0"

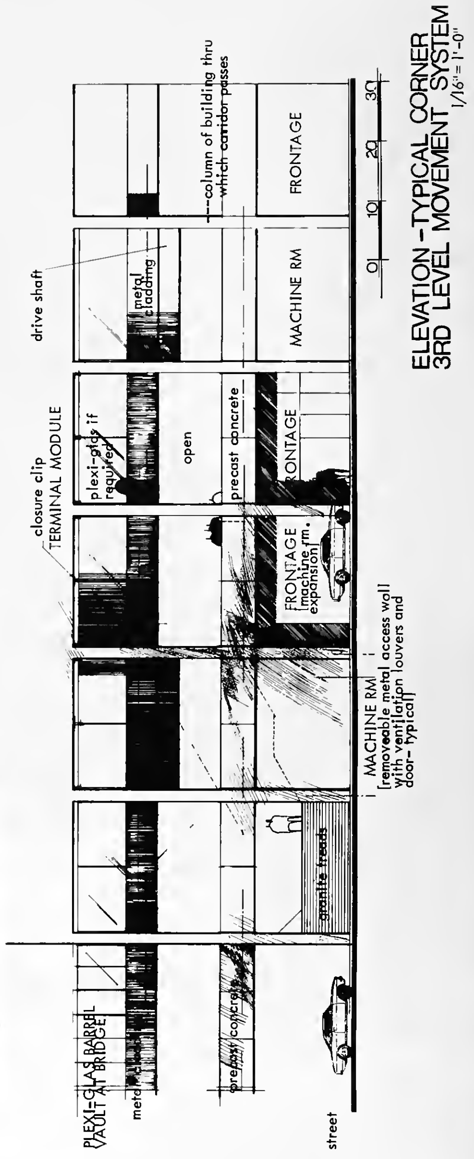


SECTION-TYPICAL MODULE
3RD LEVEL SYSTEM 1/8"=1'-0"

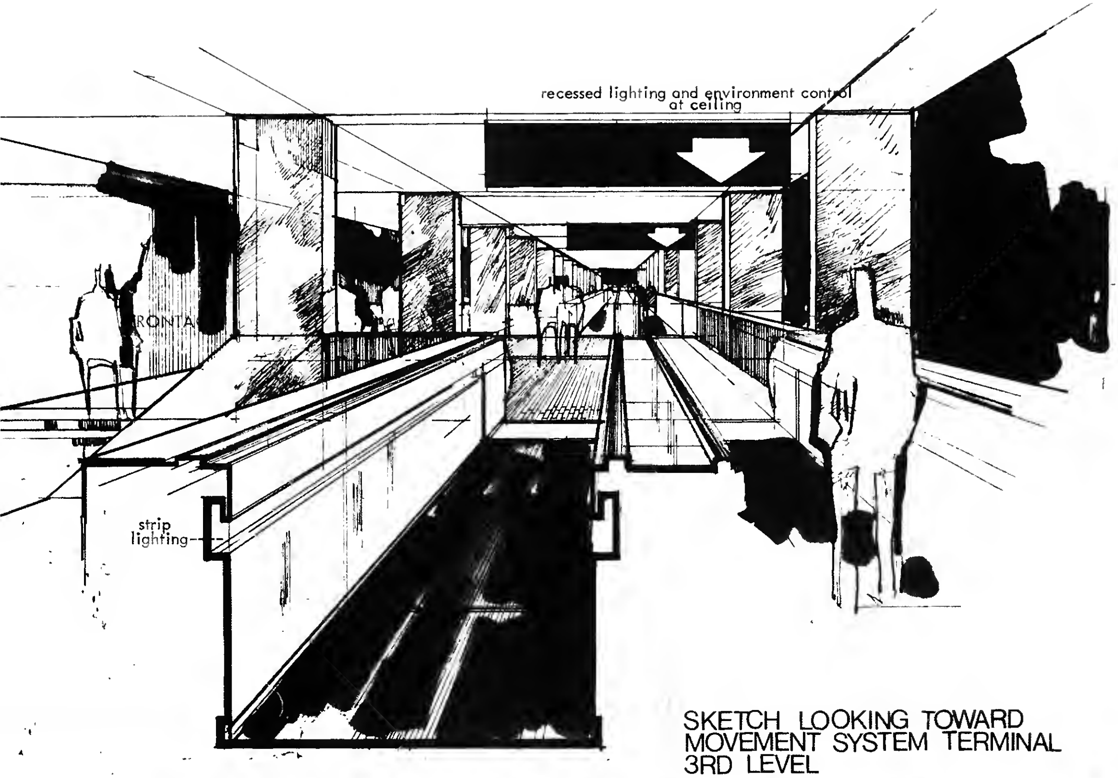
PLATE 9-5



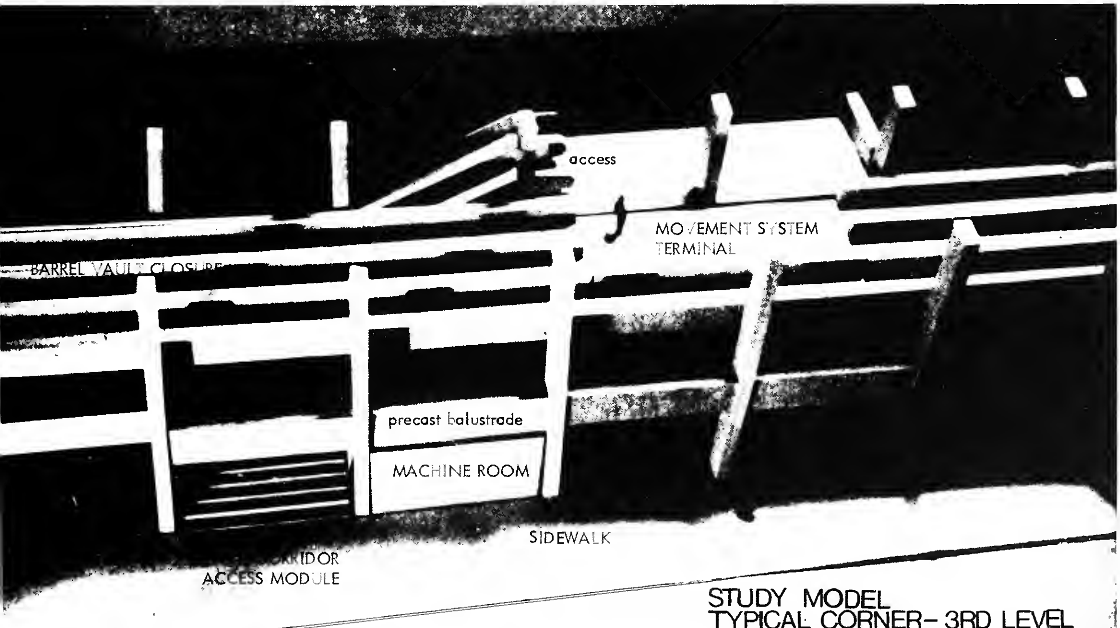
LONGITUDINAL SECTION 1/16"=1'-0"



ELEVATION - TYPICAL CORNER 3RD LEVEL MOVEMENT SYSTEM 1/16"= 1'-0"



SKETCH LOOKING TOWARD
MOVEMENT SYSTEM TERMINAL
3RD LEVEL



STUDY MODEL
TYPICAL CORNER- 3RD LEVEL
MOVEMENT SYSTEM

[Study model used during early planning
for mocking up various conditions.]

COMPARISON - 2ND AND 3RD LEVEL MOVEMENT SYSTEM

ITEM	2ND LEVEL	3RD LEVEL	COMMENT
Horizontal R.O.W.:	Possibly wider in order to accommodate 2 walks plus pedestrian way at bridges.		
Vertical R.O.W.:	Function of service requirements.	Minimum.	
Down-time and Shutdowns:	No alternate belt to supply service to users during down-time; may impede pedestrian flow; recognizable impact on corridor environment.	Does not affect Corridor flow or disrupt normal pedestrian activity on 2nd level; system users moy be redirected to alternate walk.	
Service and Maintenance:	Service via tunnel 2 of 5 segments.	Service continuous length of corridor via access panels at bottom of system above, - maintenance cart.	Note: Tunnel restricts headroom at commercial frontage D5 to 8'-0".
Orientation:		Minimizes distraction to user; most stable frame of reference; separates different user needs.	
Environmental Control:	Semi-exposed; infra-red at clg.	Either semi-exposed or closed.	
Ventilation:	Machine rooms at grade and continuous balustrades.	Bottom of system.	
Speed:		Must be accelerated system.	
Sight Lines:		Improves sight lines for walking pedestrian.	
Machine Interface:		Most attractive corridor spatially.	

ITEM (continued)	2ND LEVEL	3RD LEVEL	COMMENT
Number of Stair Elements:		2 additional.*	*May be offset by deleting sliders and tunnel, R.O.W. width
Number of escalators:		2 additional.*	
Structure at bridges:	Similar.	Similar.	Present planning admits additional trusses at 2nd level to support movement system within prototypical pedestrian bridge with 19-120 span.
Pedestrian flow:	Conflicts.	Good.	
Noise:	System may be noisy in frontage below.	System may be noisy in Corridor.	
Security:	When system is down, decided impact on Corridor.	Access to system may be controlled; Corridor open to pedestrians at hours when system is down. Safety buttons are away from general vandalism.	
Relationship of frontage to terminals:	Special prominence at terminal points.	Generalized prominence.	
Corridor capacity:		Increased capacity.	
Frontage:		Increased - 3rd level frontage potential.	

Following review and comment on progress studies the final phase of the design portion of the study continued development and examination of two basic Corridor alignment alternates:

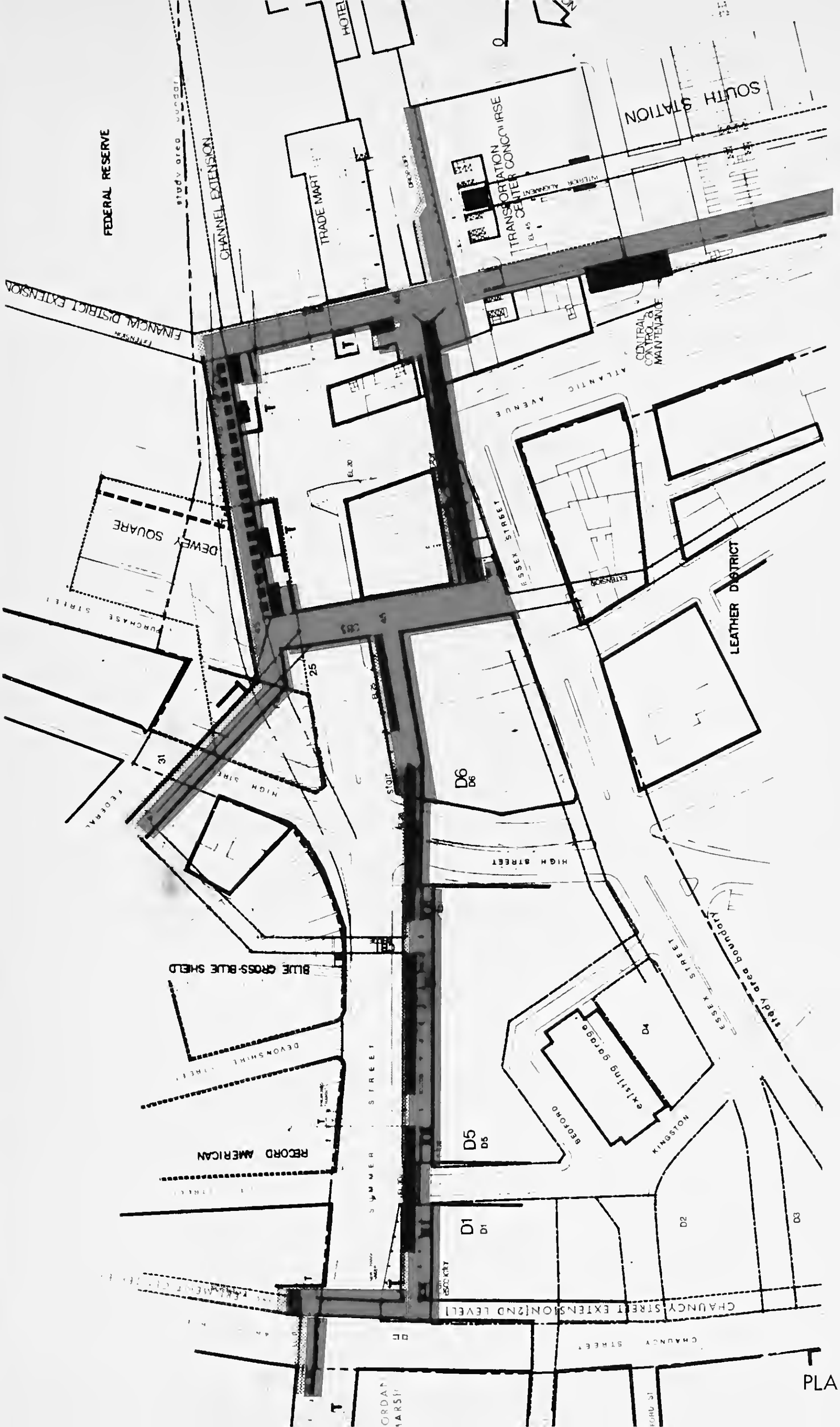
Alternate I (Straight Alignment)
(Straight alignment following Summer Street and connecting to the Transportation Center at Summer Street);

Alternate 2 (Forked Alignment)
(Connecting to the Transportation Center at Essex Street).

Alternate 2 (Forked Alignment) was initially studied in the form indicated in PLATE 9-3, in which the alignment connects to the Transportation Center at Essex, moving along the Essex frontage of the proposed Dewey Square Tower. This alignment was found unsatisfactory in meeting both CBD development criteria and in meeting transportation 'system' requirements of continuity, clarity and effective performance. The final phase of the study proposed a modification (PLATE 9-8 opposite) adding an arm to the North of Summer Street in an effort to meet these criteria.

This modified proposal does meet CBD development criteria, but does not improve on the alternates ability to provide an effective transportation 'system'.

Conclusion: Alternate I (Straight Alignment) was therefore recommended for its ability to meet both transportation system requirements of continuity, clarity and effective performance, in addition to its permissiveness of long-range development of the CBD as a whole. (See Sections 2 and 4).


FEDERAL RESERVE
CHANNEL EXTENSION
TRADE MART
HOTEL
SOUTH STATION
TRANSPORTATION CENTER CONCOURSE
FINANCIAL DISTRICT EXTENSION
CENTRAL CONTROL & MAINTENANCE
ATLANTIC AVENUE
DEWEY SQUARE
ESSEX STREET
LEATHER DISTRICT
PURCHASE STREET
HIGH STREET
FEDERAL
D6
BLUE CROSS-BLUE SHIELD
DEVONSHIRE STREET
SUMMER STREET
RECORD AMERICAN
D5
D4
existing garage
BEDFORD
KINGSTON
study area boundary
D1
D2
D3
CHAUNCY STREET EXTENSION (2ND LEVEL)
CHAUNCY STREET
PLATE 9-8